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MANUAL OF JOINT SERVICES WING EXAMINATIONS

with Three Years Latest Examination Papers
and Test Papers with Solutions

BY

H. C. BANJARI

Careers Today

PUBLISHERS

Sohanganj Street, DELHI

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**JOINT SERV
EXAMINA**

This book provides information which is of entry into the Joint. It is a practical guide to the organisation of study and labour, showing how it can be achieved with certainty.

It contains within its pages rules and regulations, definitions, examination questions, examination papers, test solutions and other useful information which are of assistance and guidance to the student.

It is an excellent and useful book for every examinee, particularly for those in the Indian Forces.



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MANUAL OF JOINT SERVICES WING EXAMINATION

FOR
ADMISSION TO THE NATIONAL DEFENCE ACADEMY,
AT DEHRA DUN, TO SECURE COMMISSIONS IN THE
ARMED FORCES, NAVY AND AIR FORCE

**A Helpful Guide to ambitious Examinees desirous of passing
Joint Services Wing Examinations held by the
Union Public Service Commission**

WITH
LATEST RULES AND REGULATIONS, THREE YEARS
EXAMINATION PAPERS AND TEST PAPERS
WITH SOLUTIONS, ETC., ETC.

BY

H. C. BANJAH

*Editor : CAREERS TODAY Magazine
and INDUSTRY TODAY Magazine*

*Author of Shorthand Teacher, Guide to Professional Studies in India,
Guide to Professional Studies in America, Guide to Professional
Studies in the United Kingdom, Guide to Duffrein Entrance
Examinations, Manual of Indian Air Force Services, Manual
of Military Wing, Guide to Proof Correcting, Guide to
P. and T. Clerks Examinations, Manual of
Indian Administrative and Allied Services
Examination etc., etc.*

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*Says—*GEN. K. M. CARIAPPA,
Commander-in-Chief,
Indian Army

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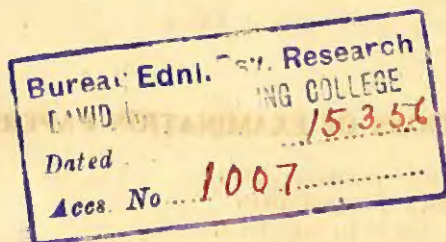
Acting Sub-Liet	2nd Lieutenant	Pilot Officer
Sub-Lieutenant	Lieutenant	Flying Officer
Lieutenant	Captain	Flight-Lieutenant
Lt.-Commander	Major	Squadron Leader
Commander	Lieut. Colonel	Wing Commander
Captain	Colonel	Group Captain
Commodore	Brigadier	Air Commodore
Rear Admiral	Major-General	Air Vice-Marshal
Vice-Admiral	Lieut. General	Air Marshal
Admiral	General	Air Chief Marshal
Admiral of the Fleet	Field Marshal	Marshal of the Air Force.

PREFACE

There are three categories of Defence Forces, namely, Armed, Air and Navy. Apart from their being suitable careers for young men, who are zealous for outdoor life, they offer unique opportunities for service to the Nation and carry a great social prestige. At the same time a great responsibility of the defence of a country devolves on them who join the Defence services. The commands of these Forces should be in the hands of educated, disciplined and well-built young men.

This painstaking and conscientious publication of ours is very useful and informative material which is indispensable to any candidate who enters into the Joint Services Wing. The rules and regulations given in this book should be taken as a guide as they are liable to slight changes from time to time by the Government of India. The past examination papers and test papers with answers have been given to give an idea of the standard of the examination and they will surely help the candidates in their success in the examination.

H. C. BANJAH



training, elementary field craft, organisation and administration of the three services, internal combustion engines, driving and maintenance theory, map reading and navigation, equation, radio telephony and man-managements, etc., etc.

Thereafter, the three kinds of cadets undergo advanced training in the particular branch of the Defence Services to which they have been allotted. The Army cadets receive this advanced training in the Military Wing while Navy and Air Force cadets proceed to the respective establishments for advanced training.

JOINT SERVICES WING EXAMINATION

RULES

1. The Union Public Service Commission hold a qualifying examination for admission to the Joint Services Wing of the National Defence Academy for the two courses commencing in January and July 6 months before the commencement of each session at Allahabad, Bombay, Calcutta, Delhi, Madras, Nagpur and at such place or places as may be notified by the Commission. The intention of holding an examination appears in the press as well as Govt. of India Gazette, two-three months in advance of the examination date.

2. A candidate who desires to appear at the examination is required to submit his application in the prescribed form together with all the necessary documents in accordance with the "Instructions to candidates regarding the filling up and submission of applications" so as to reach the Union Public Service Commission, P.B. No. 186, Parliament House, New Delhi, before the prescribed date. No application received after the prescribed date is entertained. Copies of the application form and other connected papers may be obtained from the Secretary, Union Public Service Commission, P.B. No. 186, Parliament House, New Delhi, or from any of the authorities noted below :—

- (i) Headquarters, Delhi Area, Delhi Cantt.
- (ii) Headquarters, Sub Area, Allahabad, Ambala, Bangalore, Dinapore, Bombay, Calcutta, Jullundur, Lucknow, Madras, Meerut and Poona.
- (iii) Headquarters, Jammu and Kashmir, Indep. L of C Sub Area, c/o New Delhi, A.P.O.
- (iv) Headquarters, Indep. Sub-Area, Jubbulpore, Secunderabad.

- (v) Air Force Recruiting Officer, Ambala Cantt., Delhi, Kanpur, Calcutta, Poona, Bangalore, Madras.
- (vi) Recruiting Officer, Jullundur, Ambala, Ajmer, Lucknow, Calcutta, Poona, Bangalore, Patna, Nagpur, Kungraghat.
- (vii) Headquarters, 21 Area c/o New Delhi, A.P.O.
- (viii) Headquarters, 181 Indep Bde. Group, Shillong.
- (ix) Commodore-in-charge, Navy Office, Vithal House, Mint Road, Bombay.
- (x) Commodore-in-Charge, Cochin.
- (xi) Naval Officer-in-Charge, Vizagapatam.
- (xii) Resident Naval Officer, Calcutta.
- (xiii) Resident Naval Officer, Calcutta.
- (xiv) P.O. 3, Air HQ, New Delhi.

Air Force Recruiting Adjutants :—

- (a) No. 1., Air Force Academy, Ambala.
- (b) IAF Station, New Delhi.
- (c) No. 1., Base Repair Depot, IAF, Kanpur.
- (d) No. 2 Equipment Depot, Bombay.
- (e) Headquarters Training Command (Unit), Bangalore.
- (f) No. 2 Group Training School, IAF, Tambaram.
- (g) No. 4 Air Force Recruiting Adjutant, 1 Gokhale Road, Calcutta 20.

The fact that an application form has been supplied on whatever date is not accepted as an excuse for the late submission of an application. Candidates who delay their requests for forms until a late date do so at their own risk.

Note :— If any candidate who has applied for admission to a previous examination for entry to the Joint Services Wing of the National Defence Academy, wishes to appear at a subsequent

examination also, he must submit his application by the prescribed date of the subsequent examination without waiting for the result of the previous examination. If he is finally selected, his candidature for the subsequent examination is cancelled by the Commission.

4. The age limits are 15 and 17 years on the first day of the month in which a course is due to commence. Preference is given to candidates aged 15 years, or as near that age as possible, for the Indian Navy.

5. Candidates must pay the following fee :— Rs. 37/8 (Rs. 9/6/- in the case of candidates belonging to the Scheduleid Castes or Scheduled Tribes with the application.

Note 1 :— Only a Treasury Receipt or crossed Indian Postal Orders for this amount is accepted. The Commission do not accept the fee in cash or by cheque.

Note 2 :— No claim for a refund of this fee is ordinarily entertained, nor is it held in reserve for any other examination or selection. A refund of Rs. 30/- (Rs. 7/8/- in case of candidates belonging to the Scheduled Castes or Scheduled Tribes is, however, made to candidates who are not admitted to the examination by the Commission.

A refund of Rs. 30/- (Rs. 7/8/- in the case of candidates belonging to the Scheduled Castes or Scheduled Tribes is also made to those candidates who secure 30 percent or more marks in the aggregate.

Note 3 :— The Commission may at their discretion remit the prescribed fee where they are satisfied that the applicant is a *bona fide* refugee and is not in a position to pay the fee.

Note 4 :— Boys of King George Royal Indian Military Colleges, whose applications are forwarded to by the Principals with the recommendation that the applicants may be expected to secure at least 30 per cent. of the aggregate marks are not required to pay any fee.

6. Candidates accepted for admission to the examination are informed of the date, time and place of the examination in due course.

7. The total intake for each course is approximately 237 cadets, consisting of 25 for the Navy, 162 for the Army, 25 for the Air Force and 25 for the State Forces.

Candidates should indicate in the application form their order of preference if they wish to compete for more than one branch of service. Due consideration is given to the preferences expressed by a candidate at the time of his application, but the Government of India reserve power to assign him to any branch of service taking into consideration the vacancies available in each branch and the aptitude of the cadet displayed whilst under training.

8. A candidate must be an unmarried male and must either be :—

- (a) a citizen of India or
- (b) a Gurkha subject of Nepal or
- (c) a person who has migrated from Pakistan with the intention of permanently settling down in India or
- (d) a subject of Sikkim or of a Portuguese or French possession in India,

and if he comes under category (c) or (d), must be a person in whose favour a certificate of eligibility has been given by the Govt. of India. A candidate in whose case such a certificate is necessary may be admitted to the examination on his furnishing proof that he has applied for the certificate and he may also be provisionally admitted to the Academy subject to the necessary certificate being eventually given to him by the Government.

Note : Persons who migrated to India from Pakistan before 19th July 1948 and have been ordinarily resident in India since then are eligible for appointment to Services and posts under the Govt. of India without certificates of eligibility *qua* citizens of India. Persons who so migrated on or after the 19th July 1948 must secure certificate of eligibility for appointment to Union Services, unless they had migrated before 30th September 1948 and had got themselves registered as citizens within the time allowed or had entered the Union Services without certificates of eligibility under the old instructions in which case certificate of eligibility will not be necessary.

9. Candidates should be medically fit in all respects. A number of qualified candidates are rejected subsequently on medical grounds. Candidates are, therefore, advised in their own interest to get themselves medically examined before submitting their applications, to avoid rejection at the final stage. The development of the candidate should be such that by the time he attains the age of 17, he will reach the standards of medical fitness shown in Appendix I.

Sufficient number of suitable candidates recommended by Service Selection Board is medically examined by a Board of Service Doctors. No candidate not passed as fit by the Medical Board is not admitted to the Academy. The mere fact that the medical examination has been carried out by a Board of Service Doctors does not mean or imply that the candidate has been finally selected.

10. Candidates must undertake not to marry, until they complete their full training at the Joint Services Wing and later on at the parent Service Establishment. A candidate who marries subsequent to the date of his application, though successful at the examination is not selected for training and a candidate who marries while under training is discharged and is liable to refund all expenditure incurred on him by the Government. Commissioned Officers are not eligible for married accommodation.

- (a) Indian Navy :—Until they are promoted to the rank of Lieut.
- (b) Army :—Until they attain the age of 25 years.
- (c) I. A. F. :—Until they complete 3 years minimum services or until they attain the age of 25 years, whichever is earlier.

11. Candidates must have passed one of the following examinations/possess one of the following certificates. Attention is however invited to notes (i), (ii) and (iii) below :—

- (a) the Matriculation Examination of a recognised Indian University ; or,
- (b) an examination accepted by any such University as equivalent to a Matriculation Examination for the purpose of admission to a University course ; or,

- (c) an examination held by a State Education Board at the end of the Secondary School Course for the award of a School Leaving, Secondary School, High School or any other certificate which is accepted by the Government of that state as equivalent to Matriculation Certificate for entry into its services ;
- (d) the Cambridge School Examination ; or,
- (e) any other examination which may be recognised by the Union Public Service Commission as equivalent to the above ;
- (f) the Indian Army Special Certificate of Education ;
- (g) the certificate issued by the Inter-Provincial Board for Anglo-Indian and European Education to 9th standard students who joined the forces during the World War II ;
- (h) the Higher Educational Test of the Indian Navy ;
- (i) the Higher Secondary Technical Examination Certificate of the Delhi Polytechnic ;
- (j) The 10th class certificate from a Higher Secondary School in Delhi/Simla ;
- (k) Junior Examination of the Jamia Millia Islamia, Delhi, in the case of *bona fide* resident students of the Jamia only ;
- (l) Bombay School Leaving Examination. (without any condition) ;
- (m) Bengal (Science) School Certificate ;
- (n) the Indian Air Force Educational Test for reclassification to leading Aircraftsman ;
- (o) the Anglo-Vernacular School Leaving Certificate (Burma) with eligibility for University course ;
- (p) the Burma High School Final Examination Certificate with eligibility for University course ;
- (q) European High School examination held by the Provincial Governments ;

- (r) Bombay Secondary School Certificate Examination with eligibility for University course ;
- (s) Ceylon Senior School Certificate examination ;
- (t) School Leaving Certificate examination of the Government of Nepal;
- (u) High School Examination certificate of the University of Rajputana ;
- (v) I. M. N. T. S. "Dufferein" Final passing out certificate ;
- (w) Post War School Leaving Certificate of Burma ; and
- (x) Certificate granted by the East Bengal Secondary Education Board, Dacca.

Note (i). In the case of candidates from the PWRIM College which prepares candidates for an examination other than the Matriculation, a certificate from the Principal to the effect that they have reached a "Matriculation Pass" standard of education is accepted.

Note (ii). Candidates who have appeared or intend to appear at any of the above examinations may also apply for admission to the Joint Services Wing Examination. The applications of such candidates are accepted provisionally and the successful ones at the examination are required to furnish proof of their having passed that examination as soon as possible and in any case before they join the National Defence Academy.

12. A candidate must satisfy the Union Public Service Commission and the appointing authority that he is suitable in all respects for admission to the Academy.

13. The decision of the Union Public Service Commission as to the eligibility or otherwise of a candidate is final.

14. No candidate is admitted to the examination unless he holds a certificate of admission from the Union Public Service Commission.

15. Any attempt on the part of a candidate or his relatives/friends to enlist support for his application may disqualify him for admission.

16. The maximum number of candidates to be admitted to the examination may in the discretion of the Govt. of India be limited to such number as the Government of India may decide. If a limit is imposed and the number of candidates exceeds that limit, the Union Public Service Commission shall select from among the applicants those who shall be admitted to the examination and shall have regard in so doing to the suitability of the applicants for admission to the Academy.

17. The examination includes the following subjects and the maximum number of marks obtainable for each subject is as follows :—

	Maximum Marks
1. English.	
2. General Knowledge. and current Affairs.	300
3. Mathematics I	300
4. Mathematics II	150
	150

In order to qualify in the written examination, candidates must obtain 40 per cent. of the aggregate marks with $33\frac{1}{3}$ per cent in each subject.

The Union Public Service Commission may, after considering the results of the written examination lower the percentages of qualifying marks if they consider it necessary to do so.

18. From the marks assigned to candidates in each subject such deduction is made as the Union Public Service Commission may consider necessary in order to secure that no credit is allowed for merely superficial knowledge.

19. Deductions for handwriting which is difficult to read are made upto 20 per cent. of the maximum marks for the written subjects. In English, and every other subject, deductions for bad English spelling are made upto 10 per cent. of the maximum marks.

20. The Union Public Service Commission prepare a list of candidates in order of their merits as disclosed by the aggregate marks awarded to each candidate at the written examination. The candidates who obtain qualifying marks at the written examination have to appear before a Services Selection

Board. Candidates to be finally selected should receive the minimum qualifying marks both at the written examination and the Services Selection Board Interview. Subject to this condition, they are then placed in the order of merit on the basis of total marks secured. The final selection for admission to the Academy is made in the order of merit depending on the number of vacancies for each course.

Candidates have to appear before the Services Selection Boards, and undergo the tests there at their own risk and are not entitled to claim any compensation or other relief from Government in respect of any injury which they may sustain in the course of or as a result of any of the tests given to them at a Services Selection Board, whether due to the negligence of any person or otherwise. Parents or guardians of the candidates are required to sign a certificate to this effect in the form given in the end hereof. Candidates when called up for interview by a Services Selection Board or for subsequent training are eligible for T.A. and D.A. in accordance with the rules then in force. Candidates who have previously been before a Service Selection Board for the same type of Commission are not entitled to T.A. and D.A. on subsequent occasions.

21. Candidates finally selected have to undergo a two years' course at the Joint Services Wing of the National Defence Academy. The successful candidates after the first two years' training have to undergo further specialised training in the branch of service for which they may be selected. The cadets for the Army receive their advanced training at the Military Wing of the Academy itself, while those for the Indian Navy proceed to Naval Training Ships/Establishments and those for the Air Forces are sent to the Air Force Academy. While at the National Defence Academy, cadets are subject to the discipline of the service for which they are selected.

22. Before a candidate joins the Academy, the parent or guardian is required to sign :—

- (a) A certificate to the effect that he fully understands that he or his son/ward shall not be entitled to claim any compensation or other relief from the Government in respect of any injury which his son/

ward may sustain in the course of or as a result of the training to be undergone by him at the Academy whether due to the negligence of any person or otherwise.

- (b) a bond to the effect that if for any reasons considered within the control of the candidate, he wishes to withdraw before the completion of the course, or fails to accept a commission if offered, he will be liable to refund the whole or such portion of the cost of tuition, food, clothing and pay and allowances, received, as may be decided upon by Government.
- (c) *a declaration by parents or guardians of candidates selected for the Indian Navy only, that they are in a position and will be prepared to discharge the financial obligations attaching to the candidates' further training if this is done in the U. K. on completion of the preliminary training at the Joint Services Wing of the National Defence Academy.

*Note. Arrangements for further Naval training in India itself are afoot and pending the completion of the same Indian Navy cadets may be sent to the U. K. for further training. Whilst under training in the U. K. parents/guardians are required to meet the private and vacation expenses, ranging from £125 to £140 approximately, of the cadets. The sum is required to be made available in two or three instalments as directed only after the departure of the cadets to the U. K.

23. During the period of training at the Joint Services, Wing, the cost of training, including accommodation, books, uniforms, boarding and medical treatment, is borne by the Government. The parents or guardians of the cadets are however, required to meet their pocket and other private expenses. These expenses are not likely to exceed Rs. 30/- per month. Where cadet's parents or guardians are unable however, to meet wholly or partly even this expenditure financial assistance upto Rs. 30/- per month may be granted by Government. No candidate whose parent or guardian has an income of Rs. 300/- per month or above is eligible for the grant of the financial assistance.

A candidate desirous of securing financial assistance should, immediately after his final selection, submit an application through the Dist. Magistrate of his district, who will, with his recommendation, forward the application to the Ministry of Defence, Government of India.

Instructions to candidates regarding the filling up and submission of applications for the examination for entry into the Joint Services Wing of the National Defence Academy, at Dehra Dun.

1. The candidate must consult the foregoing rules and go through the Notice and Notification issued by the Union Public Service Commission and the Ministry of Defence in the Gazette of India respectively, before the holding of the examinations, to see if they are eligible for the examination before filling up the application form or paying the prescribed fee. The fact that an application form and other papers relating to the examination have been supplied to a candidate is no evidence of his eligibility for admission to the examination.

2. The application form must be filled up in the candidate's own handwriting. All columns must be completed and all answers must be given in words and not by dashes or dots. The application should be submitted direct to the Secretary, Union Public Service Commission, Parliament House, P.B. No. 186, New Delhi. A service candidate must submit his application through his Commanding Officer, who will if he considers the candidate eligible, forward it to the Union Public Service Commission, with his recommendation. Applications of eligible candidates are not withheld even if the candidates are not recommended. Indian Navy boys and artificer apprentices under training will apply for entry into the Indian Navy only.

Candidates from the Prince of Wales's Royal Indian Military College, Dehra Dun, and K.G.R.I.M. colleges should submit their applications through the Principal of the college.

3. Application should be sent by registered post when they cannot be presented in person. If a candidate fails to register his application, he does so at his own risk. If he desires an acknowledgment, he should send his application 'Registered Acknowledgment Due'.

4. If before or after the examination it is found that a candidate has knowingly furnished any particulars which are false, or has suppressed material information, he is disqualified, and, if already admitted to the Academy, removed.

5. The candidate must send the following documents with his application :—

- (i) A treasury receipt or crossed Indian Postal Orders, payable to the Secretary, Union Public Service Commission for Rs. 37/8/- (Rs. 9/6/- in the case of candidates belonging to the Scheduled Castes or Scheduled Tribes). Fees in cash or by cheque are not accepted.
- (ii) A certificate of age.
- (iii) A certificate of educational qualification in original.
- (iv) Declaration mentioned in Para 20 of the Rules hereof.

Details of the required documents are given below :—

Candidates are warned that if the application is incompletely or wrongly filled up or is not accompanied by the documents mentioned in items (ii) to (iv) above or by a reasonable explanation for the absence of such documents it will be summarily rejected and that no appeal against its rejection is entertained.

Candidates must submit the documents which they have not sent with their applications, and for the absence of which they have given explanation in their applications, soon after the submission of the applications. In any case they must be sent so as to reach the Commission's office one month before the date of commencement of the examination; otherwise their candidature for the examination is rejected.

Candidates are also warned that they should in no case tamper with the entries in the documents submitted by them. Candidates found guilty of tampering are liable to be prosecuted in addition to being permanently debarred from Commission's examinations and selections and for employment under Government.

- (i) A treasury receipt or crossed Indian Postal Orders for Rs. 37/8/- (Rs. 9/6/- in the case of candidates belonging to the scheduled castes or scheduled tribes). The amount may be deposited in the nearest Government Treasury, or in a branch of the Imperial Bank of India or in a State Treasury authorised to transact business on behalf of the Government (Amount deposited at Bombay; Calcutta, Delhi or Madras should be deposited in the Reserve Bank of India instead of in the Imperial Bank of India). The Treasury or Bank should be asked to credit it to Government under the account head "XXXVI—Miscellaneous Departments—Examination fees—Receipts of the Union Public Service Commission."

Candidates must see that they are eligible and must decide definitely to enter for the examination before depositing the fee in the treasury (or Bank). The fee is not returned in any circumstances whatever nor is it held in reserve for any other examination or selection once an application has been considered by the Commission.

A refund of Rs. 30/- (Rs. 7/8/- in the case of candidates belonging to the Scheduled Castes or Scheduled Tribes) is however allowed to a candidate if he is not admitted to the examination by the Commission or having been admitted secures 30 per cent or more of the aggregate marks at the examination. The name of the examination and of treasury at which the fee is deposited should be clearly entered in the treasury receipt. The treasury receipt should be on the form pertaining to Central Government transactions and should be obtained from the treasury at which the fee is deposited.

Note 1: Candidates, who are at the United Kingdom, Australia, Pakistan, Burma, Ceylon or Malaya at the time of submitting their applications should deposit the amount of their prescribed fee (the equivalent fee of Rs. 37/8 (Rs. 9/6 in the case of candidates belonging to the Scheduled Castes or Scheduled Tribes) in the office of the High Commissioner for India in the United Kingdom, Australia, Pakistan, or in the office of the Govt. of India's representative in Ceylon or Burma, as the case may be and forward the receipt from that office.

Note 2. Cash or cheques are not accepted by the Union Public Service Commission. All postal orders should be crossed and made payable to the Secretary, Union Public Service Commission at New Delhi Post Office and in no case postal orders payable at any other post office are accepted.

Note 3. An application not accompanied by a Treasury Receipt or crossed Indian Postal Orders for Rs. 37/8/- (Rs. 9/8/- in the case of candidates belonging to the scheduled castes or scheduled tribes) is summarily rejected and no explanation for inability to send the Treasury Receipt or crossed Indian Postal Orders with the application is considered. This does not apply to refugee candidates seeking remission of the fee (*vide* para. 12 below) and to the boys of the K. G. R. I. M. Colleges.

(ii) *Certificate of age :*

- (a) The only proof of age ordinarily accepted by the Commission is the age or date of birth entered in the Matriculation Certificate or one of the other certificates listed in paragraph 11—of the Rules. This certificate must be sent with the application in original. If a Matriculation or equivalent certificate does not give the exact date of birth the candidate must send in addition to the Matriculation or equivalent certificate, a certificate in original from the Headmaster of the High School which he first attended showing the date of his birth or his exact age as recorded at the time of his admission to the school. An Anglo-Indian or an Indian Christian may send his original Baptismal or Birth Registration Certificate instead of the Headmaster's certificate.

A candidate who has passed the Matriculation or equivalent examination as a private student must submit in addition to the Matriculation or equivalent certificate, a certificate from the Headmaster of the school which he first attended showing the date of his birth or his exact age as recorded in the school admission register. If no school was ever attended a certified extract from the Municipal Birth

Register relating to himself or some other convincing proof in support of the age stated in the Matriculation certificate should be submitted. The application of a private student who can produce no satisfactory evidence in support of the age stated in his Matriculation certificate has not been issued to a candidate, he should submit along with his application an age certificate from the Headmaster of the school from where he appeared in the Matriculation examination. Such a candidate is required to submit his original Matriculation Certificate before he is admitted to the National Defence Academy. He is disqualified if later on it is found that the date of birth claimed by him in the application differs from that entered in his Matriculation Certificate unless the discrepancy is explained to the satisfaction of the Union Public Service Commission.

Note 1. A transfer certificate from a school or college is not accepted as evidence of age.

Note 2. The age and nationality certificate, issued by some provincial authorities is not required.

Note 3. Refugee candidates, who have lost their original Matriculation Certificates in Pakistan, should obtain duplicate certificate from University concerned.

If they are unable to obtain the duplicate Matriculation certificate from the University, they should submit an extract from the University Gazette in which their results were published showing their date of birth and certified by the Registrar or the Headmaster.

Note 4. Ordinarily, Commission do not accept a date of birth other than and proved or supported by the Matriculation Certificate. If they do so they require an only convincing proof of the date claimed but also a satisfactory explanation of the incorrect entry in the Matriculation Certificate. When once a date of birth has been claimed and accepted by the Commission for the purpose of admission to the examination, no change is allowed at a subsequent examination. Candidate who wish to challenge the entry of their age in a Matriculation Certificate must do so at the first opportunity. In such cases,

a candidate must send direct to the Union Public Service Commission all the evidence on which he bases his claim as soon as he has submitted his application.

(b) Candidates from the Prince of Wales Royal Indian Military College, Dehra Dun, or K. G. R. I. M. Colleges must submit a certificate of age from the Principal of the College and no other certificate as evidence of age is required.

(iii) *Certificate of educational qualifications* : A certificate or diploma in original showing that the candidate has one of the qualifications prescribed for the examination. The certificate submitted must be one issued by the authority (*i.e.*, University or other examining body) awarding the particular qualifications. If such a candidate or diploma is not submitted the certificate must explain its absence, and submit such other evidence (in original) as he can to support his claim to the requisite qualifications. The Commission consider this evidence on its merits, but do not bind themselves to accept it as sufficient.

Note 1. Candidates who have appeared or intend to appear at any of the examinations mentioned in paragraph—11 of the Rules may also apply for admission to the examination. The applications of such candidates are accepted provisionally and the successful ones at the examination are required to furnish proof of their having passed that examination as soon as possible and in any case before they go in the National Defence Academy.

Note 2. Candidates from the P. W. R. I. M. College should submit a certificate from the Principal to the effect that they have reached a Matriculation Pass standard of education.

Note 3. In exceptional cases a candidate who has been prevented from obtaining a Matriculation Certificate or its equivalent for reasons beyond his control may at the discretion of the Union Public Service Commission be admitted to the examination provided he produces a certificate from a Gazetted Officer or the Central or the Provincial Government or a Principal or Headmaster specifying the institution where he

studied up to the Matric class, the University or Board which was holding the Matriculation examination whether admission certificate was issued to him and the reasons which prevented him from taking the examination.

6. Candidates may be required at the interview by the Services Selection Board to produce in original the document or documents, if any, containing particulars of the services rendered by the father or any of the relatives of the candidates in a Military capacity.

7. Copies of the certificates mentioned in Paragraph (5) (ii) and (iii) above should also be submitted along with the original. If the candidate has already submitted any of these certificates in connection with any other examination conducted by the Union Public Service Commission and if it has not yet been returned to him, he should mention the fact when submitting his application, and if possible, enclose a copy of the certificate. If the certificate is not with the Commission, it should be sent with the application whether the candidate appeared at a previous examination conducted by the Commission or not. If any certificate cannot be submitted with the application, reasonable explanation of its absence must be given.

Candidates are advised to keep attested copies of their original certificates with them before submitting them to the Union Public Service Commission, as the Commission do not undertake to return the original certificates until orders are passed on their applications, nor do they undertake to supply attested copies to candidates.

Note. Certificates other than those mentioned in paragraph (5) (ii) and (iii) above are not returned.

8. All communication in respect of an application should be addressed to the Secretary, Union Public Service Commission, Parliament House, Post Box No. 186, New Delhi, and should contain the following particulars :—

(a) Name of Examination, (b) Month and year of Examination, (c) Roll No. if communicated to the candidate, (d) Name of Candidate ; and (e) Address as given in application.

Communications which do not contain these particulars may not be attended to.

9. The fact that an application form has been supplied on a particular date is not accepted as an excuse for the late submission of application or as evidence of the receiver's eligibility to compete.

10. Every candidate for admission to the examination is informed at the earliest possible date of the result of his application.

All returnable certificates or papers are returned when the result of his application is communicated to the candidate.

11. Candidates must make arrangements to see that communications addressed to them to the address stated in their applications are redirected, if necessary. Also any change of address should be communicated at once to the Secretary of the Union Public Service Commission. If a change of address has taken place after the examination, it should also be notified to Army Headquarters (India) A. G's Branch, SP2, Defence Headquarters, P. O. New Delhi. Although the authorities make every effort to take account of changes in candidates' addresses, they do not accept any responsibility in the matter.

12. A refugee seeking remission of the prescribed fee should forward along with the application his Refugee Registration Card (in original) and a certificate (also in original) from a District Officer of Government or a Member of the Parliament or a State Legislature to show that he is not in a position to pay the prescribed fee.

13. (i) A person who has migrated to India from Pakistan and in whose case a certificate of eligibility is required in terms of the Note under Rule 8 or who is a subject of Sikkim or of a Portuguese or French possession in India should produce proof of his having applied to the Government of India, Ministry of Defence, for issue of the required certificate of eligibility in his favour.

(ii) If a certificate of eligibility is not necessary in the case of a person who has migrated from Pakistan, *vide* Note under Rule 8 he should produce an affidavit sworn before a First Class Magistrate in one of the following forms, whichever may be applicable to him :—

1. "I declare that I migrated to India from Pakistan before the 19th July 1948 and have ordinarily been resident in India in the State of-----since then."
2. "I declare that I migrated to India from Pakistan after 18th July 1948 but before the 30th September 1948 and have ordinarily been resident in India in the State of-----since then."

I further declare that I had **got myself* registered as a citizen of India before the 26th January 1950, or **entered* the Union Services without a certificate of eligibility under the old instructions before the 26th January 1950." (*Delete the portion not applicable.)

FORM OF CERTIFICATE TO BE SIGNED BY THE PARENT/GUARDIAN OF A CANDIDATE, *VIDE* PARA 20 OF THE RULES

I (name).....father/guardian of (name).....who is a candidate for a Regular Commission in the Indian Land Forces/Indian Navy, Indian Air Force, hereby certify that I fully understand that my son/ward will, if required, attend a Services Selection Board with my full and free consent and at my own risk and that I or my son/ward shall not be entitled to claim any compensation or other relief from the Government in respect of any injury which my son/ward may sustain in the course of or as a result of any of the tests given to him at the said Services Selection Board; whether due to the negligence of any person or otherwise.

Place.....
Date.....

Signature of father/guardian.

Accession No. 1007

SYLLABUS FOR ENTRANCE EXAMINATION TO THE JOINT SERVICES WING OF THE NATIONAL DEFENCE ACADEMY

All papers must be answered in English unless otherwise expressly stated.

Papers are set on the following subjects :—

Paper 1.	English	2½ hrs. 300 marks.
Paper 2.	General Knowledge and current affairs.	2½ hrs. 300 marks.
Paper 3.	Mathematics I	2 hrs. 150 marks.
Paper 4.	Mathematics II	2 hrs. 150 marks.

The standard for these papers is approximately the same as that of the Matriculation Examination.

ENGLISH—

Questions may be asked on any of the following :—

- (a) An exercise in composition to test a candidate's abilities to write English that is simple and grammatical correct.
- (b) A simple prose passage to be condensed by the candidate with the object of testing comprehension and expression.
- (c) Correction of sentences.
- (d) Reported Speech, Questions and Commands.
- (e) Uses of simple words having similar pronunciations but different meanings and common phrases.

GENERAL KNOWLEDGE AND CURRENT AFFAIRS

Questions to be set on the general geography of the world with particular reference to India, Indian History, everyday science and current affairs.

MATHEMATICS—I

Arithmetic and Mensuration.—Vulgar and decimal fractions, ratio and proportion, percentages, averages, profit and loss, simple and compound interest, stocks and shares, square roots of whole numbers and decimals, areas and volumes of regular figures.

MATHEMATICS—II *Algebra and Geometry.*

Algebra.—Addition, subtraction, multiplication, division, simple equations, H.C.F., L.C.M., fractions, simultaneous equations, involution, evolution, factors, quadratic equations.

Geometry.—Knowledge of the properties of angles at a point, parallel straight lines, angles of a triangle, congruency of triangles, properties of the angles, sides and diagonals of a parallelogram, rhombus, rectangle, square and trapezium.

Properties of circles i.e., angle subtended by an arc or chord at the centre of a circle is double that subtended at the circumference, angle in a semi-circle is at right angles to the radius at the point of contact, angle between chord and tangent equal to angle in the alternate segment.

Constructions, Bisection of angle and straight line, construction of perpendiculars, parallels, triangles, tangents to circles, inscribed and circumscribed circles of triangle.

APPENDIX I

PHYSICAL STANDARDS FOR ADMISSION TO THE NATIONAL DEFENCE ACADEMY (JOINT SERVICES WING).

(a) *The Indian Navy.*—Candidates for the Indian Navy should conform to the minimum physical standards as laid down for the Army in sub-para. (b) below. In addition they should have the following visual standards :—

Distant (one eye)	6/6 without glasses.
Vision (Worse eye) not less than	6/12 without glasses.
Near vision (each eye)	D.O. 6 without glasses.
Colour vision	Grade I.

Any defected vision should Not be such as entail use of glasses for distance and any defect must be of a refractive error only, capable of correction by glasses to 6/6.

(b) *The Army.*

Height without shoes	Chest	
	Girth when expanded	Range of expansion not less than
Inches	Inches	Inches
62 and under 65 	33	2
65 and under 68 	33½	2
68 and under 72 	34	2
72 and upwards 	34	2

(c) *The Indian Air Force.*

As in (b) above modified as follows :—

GENERAL

The general physical condition should be excellent.

EYES

- (i) Visual Standard—should have excellent eyesight without glasses.

The minimum standard of visual acuity must be 6/6 in one eye and 6/9 in the other without glasses.

- (ii) Candidates who wear glasses habitually, are to be rejected.

- (iii) Trachoma cases are NOT acceptable in the I.A.F.

- (iv) Colour vision—should be normal or defective safe.

AUDITORY STANDARD

- (i) Hearing should be very good.
- (ii) Chronic Suppurative Otitis Media is a cause for permanent rejection.

January 1949

ENGLISH LANGUAGE

Time allowed : 2½ hours.

Maximum Marks : 300

Candidates are required to attempt all the questions. The marks allotted to each question are shown at the end of each question.

Answers must be written in English.

1. The following passage is about 480 words long. Read it carefully, and then make a precis in not more than 160 words. Suggest a suitable title for the passage. Mark off every ten words of your precis, and at the bottom state the number of words it contains :—

The first of my prejudices is that I believe in inequality. I'm not at all sure that that is a prejudice confined to myself—most people seem to act upon it in practice, even in America. But I not only recognize the fact, I approve the ideal of inequality. I don't want, myself, to be the equal of Drawin or of the German emperor ; and I don't see why anybody should want to be my equal. I like a society properly ordered in ranks and classes. I like my butcher or my gardener to take off his hat to me, and I like, myself, to stand bareheaded in the presence of the Queen. I don't know that I'm better or worse than the village carpenter ; but I am different : and I like him to recognize that fact, and to recognize it myself. In America, I am told every one is always informing you, in every-

thing they do and say, directly or indirectly, that they are as good as you are. That isn't true, and if it were, it isn't good manners to keep saying it. I prefer a society where people have places and know them. They always do have places in any possible society; only, in a democratic society, they refuse to recognize them; and, consequently, social relations are much ruder, more unpleasant, and less humane than they are, or used to be, in England. That is my first prejudice; and it follows, of course, that I hate the whole democratic movement. I see no sense in pretending to make people equal politically when they're unequal in every other respect. Do what you may, it will always be a few people that will govern. And the only real result of the extension of the franchise has been to transfer political power, from the landlords to the trading classes and the wire-pullers. Well, I don't think the change is a good one. And that brings me to my second prejudice, a prejudice against trade. I don't mean, of course, that we can do without it. A country must have wealth, though I think we were a much better country when we had less than we have now. Nor do I dispute that there are to be found excellent, honourable and capable men of business. But I believe that the pursuit of wealth tends to unfit men for the service of the State. And I sympathize with the somewhat extreme view of the ancient world that those who are engaged in trade ought to be excluded from public functions. I believe in Government by gentlemen; and the word gentleman I understand in the proper, old-fashioned English sense, as a man of independent means, brought up from his boyhood in the atmosphere of public life, and destined either for the army, the navy, the Church or Parliament. I don't believe that country will ever be great which is governed by merchants and shopkeepers and artisans. Not because they are not, or may not

be, estimable people ; but because their occupations and manner of life unfit them for public service. 100

2. Write a short essay of about 400 words on *one* of the following subjects :—

- (a) A Book-worm.
- (b) If I had the gift of performing miracles.
- (c) Safety lies in re-arming, not in disarming.
- (d) Olympic Games. 100

3. Rewrite the following sentences correctly :—

- (a) He neither has nor will accept your terms.
- (b) The more he weighed the less he liked to agree with the proposal of his friend.
- (c) I think everyone of these men are incompetent.
- (d) If you deny to help me I must abandon the task.
- (e) What to speak of shelter we had not any clothes even.
- (f) Both in Lahore as well as Amritsar there was good deal of excitement.
- (g) There was a boy in a school who could not play hockey.
- (h) The report was not unfortunately sent in time. 20

4. Change the following into indirect form :—

‘You’ve got a crew of eight,’ said Fenton, ‘four to a watch.’ But you have got no officers’.

‘I know that only too well,’ said the captain. ‘But what about that ? You can’t sail a ship without officers.’

‘I can and I shall. I shall make one of the crew mate and take the other watch myself,’ said the captain.

'That won't do,' said Fenton. 'None of the men can be trusted nor do they know the job. And you are still too weak to do regular duty.'

The captain snorted, 'I am the master of this ship, I know what to do. And where can I get officers on the high seas?'

'I can tell you,' said Fenton. 'There are two responsible persons sitting here who have some experience of ship.'

20

5. Substitute one word for expression in italics :—

- (a) His voice was *slow that it could not be heard*.
- (b) I am *liable to be called to account for my action*.
- (c) Wordsworth and Scott were *living in the same age*.
- (d) The contents of this box are *liable to catch fire easily*.
- (e) He died *without making his will*.
- (f) Nowadays *favour from high officials to their relatives is a common practice*.
- (g) We have yet to discover a *remedy that cures all diseases*.
- (h) *Too much official formality is harmful to efficiency*.
- (i) I repeated all that he had told me *word for word*. 20
- (j) Your writing is *such that it cannot be read*.

6. Construct sentences to illustrate the difference, between :—

elder, older ; willful, willing ; tamper, temper ; stile, style ; rout, route ; respectful, respectable ; proscribe, proscribe ; ordinance, ordnance ; moat, mote ; lightning, lightning.

20

7. Expand the following into a well-reasoned paragraph of about 100 words :—

All healthy men like fighting, and like the sense of danger ; all brave women like to hear of their fighting, and of their facing danger ; this is a fixed instinct in the fine face of them..... 20

January 1949

MATHEMATICS

PAPER I

Time allowed : 2 hours.

Maximum Marks : 150

Candidates should answer the COMPULSORY Questions 1 and 2, and four others.

Answers must be written in English.

All questions carry equal marks.

1. (a) Express as a decimal, correct to 3 places, each of the following expressions, and hence determine which is the nearer approximation to $\sqrt{19}$:—

$$(i) 4 + \frac{1}{2 + \frac{1}{1 + \frac{2}{7}}}$$

$$(ii) 4 + \frac{3}{8} - \frac{3}{32} \times \frac{3}{16}$$

- (b) Find, correct to 3 significant figures, the value of $(9.348)^2 - (9.338)^2$.

2. (a) The average weight of 5 men is 172 pounds ; two of them weigh 138 pounds and 180 pounds respectively. What is the average weight of the remaining three ?

- (b) If a bankrupt's liabilities are Rs. 4,278 and his assets Rs. 2,986, what percentage of his debts can he pay ? Give your answer correct to one place of decimals.

(c) By selling an article for 121-8-0 its owner made 8% profits on its costs price; what would have been his gain per cent if he had sold for Rs. 126?

3. A man borrows Rs. 8,000, partly at $3\frac{1}{2}\%$ per annum simple interest and partly at $4\frac{1}{4}\%$ per annum simple interest. He pays altogether Rs. 296 $\frac{1}{2}$ per annum as interest. How much did he borrow at the lower rate?

4. A man borrows Rs. 3,783 to be repaid in three equal annual instalments, at the end of each year. Find the value of this instalment, compound interest being at the rate of 5% per annum.

5. A man invested Rs. 7,275 in 5% stock at 97. Find the annual income. He sold at par and invested the proceeds in $3\frac{1}{2}\%$ stock. Find the price of this stock if his income was unaltered.

6. A circular flower-bed has a diameter of 25 ft. 8 in. and is to be surrounded by a path 4 ft. 8 in. wide. This path is to be edged on both sides and asphalted. The edging costs 6 as. per ft. and the asphalt Rs. 2-4-0 a square yard; find the total cost.

$$\left[\pi \equiv \frac{22}{7} \right]$$

7. An ingot of lead in the form of a right circular cylinder measures 19 in. in height and $6\frac{1}{4}$ in. in diameter. Another is $14\frac{1}{2}$ in. high and $5\frac{3}{4}$ in. in diameter. They are melted together and made into a single cylinder 22 in. high. Find the diameter of the new cylinder, correct to two decimal places.

8. A dealer has two kinds of tea for which he paid Rs. 1-12-8 and Rs. 2-2-8 per lb. respectively. He blends them in the ratio of 4 lb. of the cheaper tea to 5 lb. of the dearer. At what price per lb. must he sell the blend in order to make $12\frac{1}{2}\%$ profit on his outlay?

9. Three partners A, B and C provide Rs. 8,000, Rs. 3,000, and Rs. 1,000 respectively of the capital of a business. Of the

gross profits B receives 20% as manager, and C receives 10% as assistant manager ; the remaining profits are then divided between the three partners in the ratio of their holdings in the business. In a year in which C receives, in all, Rs. 570, what will be the incomes from the business of A and B .

10. Troops march 3 miles in 50 minutes. They start on a march at 9 a.m. and rest the last 10 minutes of every hour. Draw a graph showing their distance from the starting-point at all times from 9 a.m. to noon. A cyclist who rides at 8 miles per hour is sent after them at 10-20 a.m. Find graphically when he overtakes them.

January 1949

MATHEMATICS

PAPER II

Time allowed : 2 hours.

Maximum Marks : 150

Candidates should attempt six questions, three from each part. All questions carry equal marks. The answers must be written in English.

Part A

1. (a) Resolve into factors :—

(i) $a^3 - 17a + 26$.

(ii) $x(x-2)(x+1)(x+3) - 16$.

(b) Find the H.C.F. of

$2x^4 - 2x^3 + x^2 + 3x - 6$ and $4x^4 - 2x^3 + 3x - 9$.

2. Simplify :—

(i) $\frac{1}{x(x-y)(x-z)} + \frac{1}{y(y-z)(y-x)} + \frac{1}{z(z-x)(x-y)}$.

(ii) $\left(\frac{x^p}{x^q}\right)^{p+q-r} \times \left(\frac{x^q}{x^r}\right)^{q+r-p} \times \left(\frac{x^r}{x^p}\right)^{r+p-q}$.

3. Solve :—

$$(i) \frac{x-1}{x+1} + \frac{x+1}{x-1} + \frac{x-2}{x-1} = 3.$$

$$(ii) x + 6y = 5z, 7x + z = 6y \text{ and } 5x + 6y - 4z = 24.$$

4. (a) Find the square root of

$$x^4 + \frac{4}{x^4} + 4x^2 + \frac{8}{x^2} + 8.$$

(b) If $x = 7 - 4\sqrt{a}$ find the value of

$$\sqrt{x} + \frac{1}{\sqrt{x}}$$

5. Solve :—

$$(i) \sqrt{\frac{x}{-x}} + \sqrt{\frac{1-x}{x}} = 2\frac{1}{6}.$$

$$(ii) \sqrt{x^2 - 16} - (x - 4) = \sqrt{x - 5x^2 + 4}.$$

Part B

6. (a) Draw a triangle whose sides are 3", 4", 5". Inscribe a circle in it, and measure its radius.

(b) Draw two circles of radii 3cm. and 4.5 cm. whose centres are 5.7 cm. apart. Draw a Direct common tangent and measure its length.

7. Prove that if two triangles have three sides of the one equal to the three sides of the other, each to each, the triangles are congruent.

A point O is taken in a rhombus ABCD such that $OA = OC$, show that OB and OD are in the same straight line.

8. Prove that if there are three or more parallel straight lines and the intercepts made by them on any straight line that cuts them are equal, then the corresponding intercept on any other straight line that cuts them are also equal.

*Prove that straight lines joining the mid-points of the opposite sides of a quadrilateral bisect one another.

9. Prove that the sum of the squares on the two sides of a triangle is equal to twice the square on the median bisecting the third side plus twice the square on half the third side.

$ABCD$ is a parallelogram and P is any point within it, such that $PA^2 + PC^2 = PB^2 + PD^2$. Show that $ABCD$ is a rectangle.

10. Prove that the angle which an arc of a circle subtends at the centre is double that which it subtends at any point on the remaining part of the circumference.

$ABCD$ is a square inscribed in a circle, and P is any point on the arc AD , show that $LAPD = 3LBPC$.

January 1949

GENERAL KNOWLEDGE

Time allowed : $2\frac{1}{2}$ hours.

Maximum Marks : 300

Candidates are required to attempt all the questions.

Answers should be written in English in the space provided against each question or part of a question. The marks for each question are shown against it : all parts of the same question carry equal marks.

1. Expand the following abbreviations :—

- (a) U N E S C O. (b) U N O. (c) A R P. (d) E R P.
(e) T V A. 15

2. Give the names of the following :—

- (a) The Governor-General of Pakistan. (b) The Minister for Foreign Affairs, India. (c) The Prime Minister of United Kingdom. (d) The Governor of Bombay. (e) The Prime Minister of the U.P. (f) The President of the U. S. A. (g) The Finance Minister, India. (h) the Indian Ambassador to Russia. (i) The Commander-in-Chief India. (j) The Queen of the Netherlands. 10

3. Where in India are the following chiefly found ?—

- (a) Petroleum. (b) Mica. (c) Gold. (d) Monazite. (e) Copper. 10

4. Where are the following, and what are they noted for ?—

- (a) Lake Success. (b) Singapore. (c) EL Alamein. (d) Wardha. (e) Hiroshima. 10

5. Give a very brief description of :—

- (a) Jet aeroplanes. (b) Penicillin. (c) Electrons. (d) Radar. (e) Asdic. 15

6. Give in order the names of the Great Mughal Emperors in India. 10

7. Where are the following, and with what industries or enterprises are they associated ?—

- (a) Sindri. (b) Damodar Valley. (c) Jamshedpur. (d) Hirakud. (e) Vizagapatam. 15

8. The persons whose names are given below include scientists, painters, poets, generals, and admirals. Arrange the names in the appropriate classes.

Hannibal, Lord Rutherford, Tagore, Eisenhower, Tennyson, Dante, Madame Curie, Nelson, Jamini Roy, Montgomery, Raphael, Faraday, Rodney, Rubens. 15

9. When it is 12 noon in Greenwich, what time will it be by the sun in—

- (a) Calcutta. (b) Delhi. (c) New York. (d) Karachi. (e) Cape Town. 10

10. Of the animals below, underline the names of those which are found in a wild state in India.

tiger, lion, zebra, porcupine, kangaroo, rhinoceros, llama, jaguar, reindeer, sambhur, okapi. 10

11. How are the following diseases spread :—
 (a) Malaria. (b) Cholera (c) Plague (d) Filaria
 (elephant-foot) (e) Typhoid. 15
 12. Explain briefly how a motor engine works. 20
 13. What questions in which India is deeply interested came before the UNO in 1948? Give a brief description of each. 15
 14. After July, 1947 India issued some postage stamps to commemorate certain events. Mention the events and the values of the stamps. 15
 15. Mention the countries that lie on the Equator. 10
 16. Give the names of ten members of the West Indies Cricket Team now touring India. 10
 17. On what rivers are the following situated :—
 (a) London, (b) Rome, (c) Berlin, (d) Paris, (e) Allaha-
 bad. (f) Cuttack. (g) Sydney. (h) St. Louis.
 (i) Cairo. (j) Bezwada. 10
 18. Describe briefly :—
 (a) Aircraft carrier. (b) Mine sweeper. (c) Tracer
 bullet. (d) Air cover. (e) Submarine. 15
 19. Mention the chief ways in which India is trying to grow more food. 15
 20. What are the following made of ?
 (a) Paper. (b) Brass. (c) Cement. (d) Dynamite.
 (e) Water. 15
 21. Name the Dominions of the Commonwealth and the Prime Minister of each Dominion. 15
 22. Mention in order the chief towns through which the Grand Trunk Express passes on its way from Madras to Delhi. 10
 23. Below are the names of some famous battles. Put down details asked for
- | Battle. | Victorious side. | Defeated side. | Country in
which it was
fought. |
|---------------|------------------|--------------------|---------------------------------------|
| (a) Waterloo. | (b) Thermopylae. | (c) Third Panipat. | |
| (d) Hastings. | (e) Blenheim. | | 15 |

August 1949

ENGLISH LANGUAGE

*Time allowed : 2½ hours.**Maximum Marks : 300.*

Candidates are required to attempt all the questions. The marks allotted to each question are shown at the end of each question.

Answers must be written in English.

1. In about 400 words write on *any one* of the following subjects :—

- (a) Imagining yourself to be a military officer, give as vivid an account as you can of a battle in which you have taken part.
- (b) Compose a dialogue between a bullock-cart and a motor-car.
- (c) What is your idea of a happy life ?
- (d) Write out a speech you would deliver for or against the subject : 'Hindi should be made the national language of India.'
- (e) Which film or film-star do you like best ? Give reasons for your choice.
- (f) Relate the autobiography of a book.
- (g) Give an account of any cricket, hockey, or football match witnessed by you or any interesting function held in your school.

120

2. The following passage consists of about 450 words. Make a precis of it in not more than 150 words. Suggest for it a suitable title (heading). Mark off every *ten* words of your precis and, at the bottom, state the number of words it contains.

It is an old remark, that boys who shine at school do not make the greatest figures when they grow up and come out into the world. The things, in fact, which, a boy is set to learn at school, and on which his success depends, are things

which do not require the exercise either of the highest or the most useful faculties of the mind. Memory (and that of the lowest kind) is the chief faculty called into play in conning over and repeating lessons by rote in grammar, in languages, in geography, arithmetic, etc., so that he who has the most of this technical memory, with the least turn for other things, which have a stronger and more natural claim upon his childish attention, will make the most forward schoolboy. The jargaon containing the definitions of the parts of speech, the rules for casting up an account, or the inflection of a Sanskrit verb, can have no attraction to the tyro of ten years old, except as they are imposed as a task upon him by others or from his feeling the want of sufficient relish or amusement in other things. A lad with a sickly constitution and no very active mind, who can just retain what is pointed out to him, and has neither sagacity to distinguish nor spirit to enjoy for himself, will generally be at the head of his form. An idler at school, on the other hand, is one who has high health and spirits, who has the free use of his limbs with all his wits about him, who feels the circulation of his blood and the motion of his heart, who is ready to laugh and cry in a breath, and who had rather chase a ball or a butterfly; feel the open air in his face, look at the fields or the sky, follow a winding path, or enter with eagerness into all the little conflicts and interests of his acquaintances and friends, than doze over a musty spelling-book, repeat barbarous formulae after his master, sit so many hours pinioned to a writing-desk, and receive his reward for the loss of time and pleasure in paltry prize-medals or scholarships. There is indeed a degree of stupidity which prevents children from learning the usual lessons, or ever arriving at these puny academic honours. But what passes for stupidity is much oftener a want of interest, of a sufficient motive to fix the attention and force a reluctant application to the dry and unmeaning pursuits of school-learning. The best capacities are as much above this drudgery as the dullest are beneath it. Our men of the greatest genius have not been most distinguished for their requirements at school or at the university.

3. Rewrite the following sentences correctly :—

- (a) I have lent him a book yesterday which he did not return yet.
- (b) Intellectual pleasure is more preferable than sensual pleasure.
- (c) The sceneries of the Himalaya mountains are wonderful.
- (d) The boy is sick since four days and so he hopes the Principal would grant him leave.
- (e) I have never and will never stoop to such meanness.
- (f) Boys should listen the advices of their parents and teachers.
- (g) He stared me at my face.
- (h) One by one all his evil deeds were brought into the light.
- (i) Neither he nor his sister are going to Calcutta.
- (j) The master said to the boy to work hard. 20

4. Change the following into indirect form :—

'Do you believe there is such a country as France ?' asked the teacher. 'Yes,' said the boy, 'for though I have never seen it, I know others who have.' 'Then you refuse to believe in anything that you are others have not seen ?' 'Most certainly,' said the youth. 'Did you ever see your own brains ?' 'Of course not.' 'Do you know anybody who has seen them ?' 'No.' 'Do you think you have got any ?' 20

5. Explain clearly the difference in the meanings of the two words in the following groups, and frame sentences to illustrate their use :—

- (a) Message ; Massage. (b) Essay ; Assay. (c) Altar ; Alter. (d) Bridal ; Bridle. (e) Compliment ; Complement. (f) Defy ; Deify. 30

6. Explain clearly the meaning of the following phrases, and frame sentences to illustrate their use :—

- (a) To bury the hatchet. (b) To make a cat's paw of.
 (c) To end in smoke. (d) To beat about the bush.
 (e) To have an axe to grind. (f) To nip in the bud.

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August 1949

GENERAL KNOWLEDGE

Time allowed : $2\frac{1}{2}$ hours.

Maximum Marks : 300.

*Candidate are required to attempt all the questions
 Answers should be written in English in the space provided
 against each question or part of question. The marks
 for each question are shown against it ; all parts
 of the same question carry equal marks.*

*In most questions a solved example is given to serve as a model.
 Do not waste time. If you do not know the answer to any
 question, leave it, and get on to the next.*

1. Name the following :—

Example : Q.—President of the U.S.A. Answer—Mr. Truman.

- (a) The Commander-in-Chief of the Indian Army.....
 (b) The Prime Minister of the Union of South Africa.....
 (c) The Foreign Minister of the U.K.....
 (d) The Governor of West Bengal.....
 (e) India's High Commissioner in Pakistan.....
 (f) The Chief Justice of the Federal Court of India.....
 (g) The Captain of the West Indies Cricket Team which
 recently toured India.....
 (h) The President of the Indian National Congress.....
 (i) The Military Governor of Hyderabad.....
 (j) The Captain of the Indian Hockey Team which won
 the Olympic Championship in 1948.....20

2. To which country do the following belong, and for what are they famous ?—

Example : Q.—Nelson. Answer—England. Great Admiral.

- (a) Lenin. (b) Baden-Powell. (c) Henry Ford. (d) Captain Scott. (e) Sir J. C. Bose. (f) Pasteur. (g) George Bernard Shaw. (h) Ranji. (i) Thakin Nu. (j) Rodin. 20

3. Where are the following places, and for what are they famous ?—

Example : Q.—Agra. Answer—India. The Taj Mahal.

- (a) Eton. (b) Taxila. (c) Geneva. (d) Hiroshima. (e) Durban. (f) Rajghat. (g) Pisal. (h) Greenwich. (i) Macedon. (j) Tel Aviv. 20

4. Between whom were the following battles fought, and which party was successful ?—

Example : Q.—Plassey. Answer—Mir Jaffar and English. English.

- (a) Marathon. (b) Trafalgar. (c) Kurukshetra. (d) The First Battle of Panipat. (e) Jutland 10

5. Who wrote the following ?—

Example : Q.—A Tale of Two Cities. Answer—Dickens.

- (a) Gitanjali. (b) The Origin of Species. (c) Mein Kampf. (d) The Three Musketeers. (e) Shakuntala. (f) Ivanhoe. (g) The Discovery of India. (h) A Midsummer Night's Dream. (i) Travels with a Donkey. (j) The Adventures of Sherlock Holmes. 10

6. Where do the following trees grow, and what are their uses ?—

Example : Q.—Cocoanut Palm. Answer—All tropical countries but thrives best near the sea. Its fruit is eaten. Its oil is used for the hair and for making face cream. Its fibre is used for stuffing mattresses. Its wood is also valuable.

- (a) Cinchona. (b) Walnut. (c) Ash. (d) Camphor. (e) Bamboc. 15

7. Name the capital of the following countries :—

Example : Q.—France.

Answer—Paris.

- (a) Turkey. (b) U.S.A. (c) Japan. (d) Egypt. (e) Eire. 10

8. Give the date of the following events :—

Example : Q.—Outbreak of World War No. 1, Answer—1914.

- (a) The Roman conquest of Great Britain. (b) The Declaration of Independence of America. (c) The Partition of India. (d) The French Revolution. (e) The birth of Jesus Christ. 10

9. Who discovered the following ?—

Example : Q.—America.

Answer—Christopher Columbus.

- (a) The North Pole. (b) That a ship could sail round the world. (c) The Cape of Good Hope. (d) Australia. (e) That the earth revolves round the sun. 10

10. What is the source of infection of the following diseases, and what should be done to prevent them from spreading ?—

Example : Q.—Cholera. Answer—The house-fly. Isolate the patient. Prevent contamination of drink and food supply. Give anti-cholera inoculation.

- (a) Smallpox. (b) Rabies. (c) Tuberculosis. 15

11. What are vitamins ? Name at least three of them, and state in what articles they are found. 15

12. In what countries are the following animals found ? Give a brief description of each and of its characteristics.

Example : Q.—Camel. Answer—In desert countries, especially Arabia and India. It has long legs with padded feet, a long neck with a hump on his back. Its hump is made up of fat, and is a storehouse for food. It can also store water in its stomach and can go for days without a drink.

- (a) The Giraffe. (b) The Elephant. (c) The Beaver. 15

13. How does the scattering of sand or dust help to put out a fire ? 10
14. Why do liquids keep hot so long in a thermos flask? 10
15. How does a telephone work ? 15
16. State simply how electric power is generated. How is it taken to our homes ? For what purposes can it be used? 15
17. For what purpose did the Commonwealth Premiers meet in London in April, 1949 ? What countries took part ? What main decision was taken ? 15
18. Why was the United Nations Commission for India and Pakistan on the Kashmir issue appointed ? What has it achieved so far ? 15
19. What are the Olympic Games ? Who started them ? What part has India taken in them ? 15
20. What do the following letters stand for :—
- Example : Q.—M. P. Answer—Member of Parliament.*
- (a) U.S.S.R. (b) H.E. (c) A.I.R. (d) V.P.P. (e) R.S.S. (f) F.M. (g) B.C. (h) H.M.V. (i) S.S.O. (j) I.N.A. 20
21. Who started the policy of merging the Indian States into Union ? Name any one of these Unions and the States which have merged into it ? 15

August 1949 MATHEMATICS

Paper I

Time allowed : 2 hours.

Maximum Marks : 150.

Candidates should answer the compulsory Question 1 or 2, and four of the remaining Questions 3 to 10, making five questions in all. Answers must be written in English.

All questions carry equal marks.

1. (a) Express as a single decimal fraction the following expressions :—

$$\frac{\frac{1}{2} + \frac{1}{4} \div (\frac{5}{8} \text{ of } \frac{3}{8})}{2\frac{2}{3} \div (3\frac{1}{3} - 2\frac{1}{2})}$$

(b) Find the difference in value between

$$\frac{7\frac{1}{8} \times 5\frac{1}{7} \div 5\frac{1}{3} \times 3\frac{1}{5}}{7\frac{1}{8} - 5\frac{1}{7} + 5\frac{1}{3} + 3\frac{1}{5}} \text{ and } \sqrt{110 \cdot 25}.$$

2. (a) The average attendance of a school for the first four days of a week is 764, and the average attendance for the first five days of the same week is 756. How many were present in the fifth day of that week ?

(b) The population of a certain town increases every year by $7\frac{1}{3}\%$. If in April, 1892, the population was 704,000, what will the population be in April, 1895 ?

3. Two troops of cavalry rent a field in common, for which they are to pay Rs. 470. One troop puts into the field 27 horses for 29 days, and the other troop puts into the field 19 horses for 33 days. How much should each troop pay ?

4. If 34 pounds of tea at Rs. 2, 4 as. a lb. are mixed with 29 pounds of tea at Rs. 1, 8 as. a lb., at what price per pound must the mixture be sold so as to gain 5% on the total outlay ?

5. By selling a horse for Rs. 700 a dealer loses $12\frac{1}{2}\%$. At what price should he have sold it so as to gain 15% ?

6. A spherical ball of lead 3 inches in diameter is melted and recast into three spherical balls. The diameters of two of these balls are $1\frac{1}{2}$ inches and $2\frac{1}{2}$ inches respectively. What is the diameter of the third spherical ball.

$$[\text{Volume of sphere} = \frac{4}{3}\pi r^3].$$

7. In what time will Rs. 8,800 amount to Rs. 10,120 at 5% per annum simple interest ?

If the same Rs. 8,800 were invested for the same time at compound interest, by how much would the compound interest exceed the simple interest ?

8. A rectangular courtyard is 100 feet long and 60 feet wide. Two paths parallel to the sides of the rectangle cross it at right angles at the centre, one from end to end, and the other from side to side. Each of these paths is 5 feet wide. Find the cost of laying the remaining area of the courtyard with lawn at 6 annas per square foot.

9. A man sold Rs. 10,000 of the 4% stock at 120, and invested the money realised in 6% stock at 150. What was the change in his annual income ?

10. A and B are two places 100 miles apart. A troop of cavalry sets out from A for B at 6 a.m. at 10 miles per hour. After four hours they rest for one hour, and then continue their journey at 10 miles per hour. Another troop sets out from B for A at 9 a.m. at 10 miles per hour. Find, by constructing a graph of their movements, (a) at what time they meet and (b) the distance of their meeting place from A .

August 1949

MATHEMATICS

Paper 2

Time allowed : 2 hours.

Maximum Marks : 150.

All questions carry equal marks. Candidates are required to attempt **five** questions, **any three** from one part and **any two** from the other.

Answers must be written in English.

PART A

- (a) Resolve into factors $a^4 - 9a^2 + 30a - 25$.

(b) The sum of two numbers is 61 and their product is 840. Find the numbers.
- (a) Solve the equation $(x-5)(x-2)(x+1)(x-4) = 4$.

(b) The ages of A and B are in the ratio of 2 : 3. Twenty years ago B 's age was double that of A . What are their ages ?
- (a) Solve the equations $\frac{xy}{x+y} = 1$, $\frac{xz}{x+z} = 2$, $\frac{yz}{y+z} = 3$.

(b) Find the L.C.M. of $6x^2 - 19x + 10$, $12x^2 - 11x + 2$ and $8x^2 + 10x - 3$.

4. (a) If

$$x = (a + \sqrt{a^2 + b^2})^{\frac{1}{3}} + (a - \sqrt{a^2 + b^2})^{\frac{1}{3}}$$

find the value of $x^3 + 3bx$.

(b) Simplify

$$\sqrt[bc]{\frac{x^b}{x^c}} \times \sqrt[ca]{\frac{x^c}{x^a}} \times \sqrt[ab]{\frac{x^a}{x^b}}.$$

5. (a) Extract the square root of

$$\frac{(a^2 + b^2)^2}{a^4 + b^4 - 2a^2b^2} + 4 \frac{a}{a+b} \times \frac{b}{a-b}.$$

(b) In a certain examination the numbers of candidates getting first class, second class and third class respectively were in the ratio 1 : 2 : 3. Ten candidates failed. The sum of the numbers of those getting second and third classes was half of the total number of candidates. Find the total number of candidates and the result of the examination in detail.

PART B

6. (a) Prove that any two sides of a triangle are altogether greater than the third side.

(b) P is any point within the triangle ABC . Prove that $AB + AC > PB + PC$.

7. (a) Prove that the angle at the centre of a circle is double of an angle at the circumference standing on the same arc.

(b) Construct an isosceles triangle ABC whose base $BC = 4''$ and angle $A = 45^\circ$, using ruler and compasses only.

8. (a) Prove that the medians of a triangle are concurrent.

(b) If a quadrilateral is bisected by each of its diagonals, prove that it is a parallelogram.

9. (a) Prove that the angles made by a tangent to a circle with a chord drawn from the point of contact are respectively equal to the angles in the alternate segments of the circle.

(b) Two circles intersect at A and B ; and through P , any point on one of them, straight lines PAC , PBD are drawn to cut the other at C and D . Show that CD is parallel to the tangent at P .

10. Draw a quadrilateral $ABCD$ having given $AB=2.8''$, $BC=3.2''$, $CD=3.3''$, $DA=3.6''$ and the diagonal $BD=3.0''$. Construct a rectangle having the same area as that of the quadrilateral, and hence find the area of the latter. Give proof of your construction.

February 1950
ENGLISH LANGUAGE

Time allowed : 2½ hours

Maximum Marks : 300

Candidates are required to attempt all questions.

The number of marks carried by each question is indicated at the end of the question.

Answers must be written in English.

1. The following passage is about 500 words long. Read it carefully, and then make a precis in not more than 150 words. Suggest a suitable title for the passage. Mark off every *ten* word of your precis, and, at the bottom, state the number of words it contains.

Freedom is a sweet sounding word. Nearly all of us love, to use it to hear or it used. Even if we do not quite understand what it means, we feel it stands for something fine and courageous. And so it does. It stands for something precious, too : something for which men and women in every part of the world have struggled and suffered and gone bravely even to their death. If we enjoy any freedom now, it is partly due to them. So it is really worth our while to know clearly what freedom is, and why it has been valued so highly. We shall ourselves thereby come to value it, and not lose it by our carelessness.

At one time it used to be said 'All men are born free' ; but we can see now that that is not true at all, for Nature binds us in all sorts of ways. The newborn baby is not free, not even as free as the new-born calf, and much less than the new-born mosquito. The young mosquito is soon able to fly away ; the calf begins to walk in a few days ; but the human baby takes at least a year even to crawl. He slowly wins his freedom by increase of strength and skill. It does not come to him in any other way.

This is equally true of all kinds of freedom. Is man free to fly through the air? He was not free to do so until, after making many vain attempts, he gained a machine to give him that freedom. You see how three things are needed for this: (a) will or determination, (b) knowledge, and (c) action. You cannot succeed without all three together.

Everything that surrounds us has a tendency to limit our freedom. The body and the mind, which are your tools for living in this world limit your freedom. How? If you do not feed your body properly, it will get ill and die. You have to decide to eat, choose what to eat, and eat: will, knowledge and action. But surely our thoughts are free. Not at all. Suppose you have been brought up in a country where everyone believes that people of a particular colour or race, or people of a particular caste or class, or people of a particular religion, are better than all others, your mind also will grow up with those ideas. If you want to change, you will need determination, knowledge, and action to make your mind free. (Even then it will not be an easy thing to do, so strong is the power of our surroundings).

Fortunately, young people naturally want to be free. I am afraid it is usually the older people who are to blame for making them grow up with narrow ideas. So, because young people are always coming into the world to take the place of the old, the human race goes on struggling for freedom.

The struggle has now gone on for a long time and we have made a good deal of progress, although we have still a long way to go.

100

2. Write a short essay of about 400 words on *one* of the following subjects:—

- (a) A Festival.
- (b) Domestic Pets.
- (c) The Education of Girls.
- (d) Love of the Motherland.
- (e) Pleasures of Travel.

3. Rewrite the following sentences correctly :—

- (a) He is not serious, but is merely pulling your legs.
- (b) I gave him many good advices, but he paid no heed to them.
- (c) You must keep your words if you have made a promise.
- (d) He went home to see his family members.
- (e) You should avail the opportunity that is given to you.
- (f) He tells that he would come here tommorrow.
- (g) He kept himself away from the meeting.
- (h) This is a good poetry.
- (i) I cannot call to my mind when I seen him last.
- (j) The quarrel which was ensured lasted for a year. 20

4. Change the following into indirect form :—

'Is your hand steady enough to write?', asked Carton. 'It was when you came in,' replied Darnay. 'Steady it again and write what I shall dictate,' said Carton, 'and write exactly as I speak.' 'To whom do I address it?' asked Darnay. 'To, no one,' said Carton. Puzzled, Darnay asked 'Do I date it?' After a pause, Carton said 'Do not bother to put down a date'.

5. Construct sentences to show the difference between :—
 adapt, adopt ; ascent, assent ; canvas, canvass ;
 carve, curve ; fare, fair ; sore, soar ; check,
 cheque ; extant, extent ; principal, principle ;
 stationary, stationery.

6. Explain clearly the meaning of *any four* of the following phrases, and frame sentences to illustrate their use :—

- (a) with a grain of salt ; (b) under a cloud ; (c) hole and corner ; (d) a cock and bull story ; (e) a square deal ; (f) salt of the earth. 20

7. Expand the following into a well-reasoned paragraph of about a hundred words :—

Liberty does not mean freedom from all restraint ; the really free man puts himself under control and moral discipline ; freedom from all restraint leads to lawlessness and loss of freedom finally.

20

February 1950

GENERAL KNOWLEDGE AND CURRENT AFFAIRS

Time allowed : 2½ hours.

Maximum Marks : 300

Candidates are required to attempt all the questions. Answers should be written in English in the space provided against each question or part of a question. Each question carries 20 marks ; all parts of the same question carry equal marks.

1. What public office is held or was recently held by each of the following persons ?—

(a) Shrimati Vijaya Lakshmi Pandit ; (b) Raj Kumari Amrit Kaur ; (c) Dr. K. N. Katju ; (d) Dr. Sita Ram ; (e) Major-General J. N. Chowdhuri ; (f) Sir Stafford Cripps. (g) Mr. E. Bevin ; (h) Mr. Dean Acheson ; (i) Sir Zafarulla Khan (j) Sheikh Abdulla.

2. What do the following letters stand for ?—

(a) viz ; (b) i.e. ; (c) etc. ; (d) N.B. ; (e) N.C.C. ; (f) W. H. O. ; (g) H. E. ; (h) H. H. ; (i) U. N. C. I. P. ; (j) B. B. C.

3. What are the following ?—

(a) Morse Code ; (b) Braille Code ; (c) Penal Code ; (d) Rules of the Road.

4. What is the structure and use of each of the following instruments ?—

(a) Thermometer ; (b) Barometer ; (c) Rain gauge ; (d) Microphone.

5. Name three Indian trees against each of the following :—

(a) The most shady trees ; (b) The most gorgeous flowering trees ; (c) Trees yielding the best timber ; (d) Trees bearing the choicest fruits.

6. Give the dates of the following events :—

(a) Death of Gautam Buddha ; (b) Indian Mutiny ; (c) World War I ; (d) World War II ; (e) Inauguration of the Indian Republic.

7. Give three names, against each of the following of creatures which do most damage to food or fruit crops in India :—

(a) Wild animals ; (b) Birds ; (c) Rodents ; (d) Insects.

8. When are the following words of command given and what action does each require ?—

(a) Attention ; (b) Mark-Time ; (c) Stand-at-ease ; (d) Eyes-Right.

9. Mention four probable causes of the present food shortage in India :—

10. What are the functions of the following parts in the mechanism of a bicycle ?—

(a) Pedals ; (b) Chain ; (c) Free-wheel ; (d) The Handle.

11. What and where are the following ?—

(a) Ajanta ; (b) Kutab Minar ; (c) Tribeni ; (d) Sarnath ; (e) Lake Success ; (f) Greenwich ; (g) Scotland Yard ; (h) Whitehall ; (i) Kremlin ; (j) The Vatican.

12. Give the meanings of the following expressions :—

(a) Maiden over ; (b) Maiden speech ; (c) Dead heat ; (d) Drawn game.

13. Who wrote the following ?—

(a) The Story of My Experiments with Truth ; (b) Life of Johnson ; (c) King Lear ; (d) Alice in Wonderland ; (e) Our India ; (f) The Gathering Storm ; (g) Treasure Island ; (h) Shah Nama ; (i) Kim , (j) Paradise Lost.

14. The following list contains designations of officers in Army, Navy, and Air Forces. Arrange the designations against the appropriate force according to rank.

Major, Second-Lieutenant, Petty Officer, Admiral, Flying Officer, Major-General, Captain, General, Squadron-Leader, Pilot Officer, Rear Admiral, Brigadier, Colonel, Commodore, Group Captain.

(a) Army ; (b) Navy ; (c) Air Force.

15. What part have each of the following persons taken in the making of the Indian Constitution ?

(a) Dr. Rajendra Prasad ; (b) Dr. Ambedkar ; (c) Shri K. M. Munshi ; (d) Professor K. T. Shah.

February 1950

MATHEMATICS

PAPER I

Time allowed : 2 hours

Maximum Marks : 150

Candidates should attempt compulsory Questions.

Nos. 1 and 2 and three of the remaining questions making five questions in all.

Answers must be written in English.

All the questions carry equal marks.

1. (a) Simplify :—

$$\frac{\frac{2}{3} \div \frac{3}{4} \text{ of } \frac{5}{6}}{\frac{2}{3} \div \frac{3}{4} \times \frac{5}{6}} \div \frac{3\frac{1}{5}}{3\frac{1}{8}} \text{ of } 0.3.$$

(b) Find the value of

$$\frac{(3.47)^2 - (2.53)^2}{1 - .06} \text{ of } \text{£}1 \text{ } 5\text{s}.$$

2. (a) If the price of milk is increased by 25%, find by what per cent the consumption of milk should be reduced so as not to increase the expenditure.

(b) The average rainfall from 1st to 7th July was 5.25 in. and that from 1st to 9th July was 5.45 in. If the rainfall on the 9th was 6.2 in., find that on the 8th.

3. X, Y, and Z started a business with Rs. 2,000 each. Three months afterwards X withdrew half of his capital but after another three months Y doubled his capital. By agreement Z is to receive 10% of the total profit for management. At the end of the year the profit amounted to Rs. 1,380. Find the share of each.

4. A man borrows Rs. 650 and pays it back in 5 annual instalments of Rs. 130 each together with the simple interest due at each payment. If the whole sum paid in interest amounts to Rs. 97-8-0, find the rate per cent.

5. A grocer sells one kind of tea at 2s. 6d. a lb. and loses 5%, and another kind at 3s. 4d. a lb. and gains 14%. He mixes the two together in equal proportions and sells the mixture for 3s. for a lb. Find his gain or loss per cent.

6. X placed a sum of money for 3 years at 5% per annum on simple interest and Y placed an equal sum at the same rate for the same time but on compound interest. Y gained Rs. 15-4-0 more than X. Find what sum was placed by each.

7. The area of a rectangular field is 15 acres, and its length is half as much again as its breadth. How long will it take a man to walk four times round it at the rate of 3 miles an hour?

8. The cost of painting the inside of the curved surface of a cylindrical oil tank at 2 as. per sq. ft. is Rs. 88. The area of its circular base inside is $38\frac{1}{2}$ sq. ft. Find how many gallons of oil it will hold if one cubic foot of space holds 6.23 gallons.

$$\left(\pi = \frac{22}{7} \right)$$

9. A person invested £1,000 in the 3 per cents at $90\frac{1}{2}$; but the price rising to $91\frac{1}{4}$, he sold the stock and invested the proceeds in the $3\frac{1}{2}$ per cents at $97\frac{1}{4}$. Find the change in his income.

10. A cyclist starts travelling at the rate of 12 miles per hour and after every one hour's ride he stops for half an hour. A motorist starts from the same place two hours after the cyclist and travels at the rate of 20 miles an hour. Find by graphical method when and where the motorist passes the cyclist.

February 1950

MATHEMATICS

PAPER 2

Time allowed : 2 hours.

Maximum Marks : 150

All questions carry equal marks. Candidates are required to attempt six questions, three from each part.

Answers must be written in English.

PART A

1. (a) Resolve into factors.

(i) $x^4 - 28x^2yz + 187y^2z^2$,

(ii) $x^6 + 64$.

(b) A father is forty years older than his son ; seven years ago he was three times as old as his son ; find their present ages.

2. (a) Simplify

$$\frac{5}{2x^2 - 7x + 3} + \frac{1}{6x^2 - 5x + 1}$$

(b) Solve the equations

$$x + y - \frac{1}{2}(x - y) = 11,$$

$$x - y + \frac{1}{3}(x + y) = 6.$$

3. (a) Solve the equations

$$2^x + 3^y = 5$$

and

$$2^{x+2} + 3^{y+1} = 17$$

(b) If

$$x = \frac{\sqrt{2}+1}{\sqrt{2}-1} \text{ and } y = \frac{\sqrt{2}-1}{\sqrt{2}+1}$$

find the value of

$$\frac{x^2 + xy + y^2}{x^2 - xy + y^2}.$$

4. (a) Solve

$$\sqrt{2x^2 + 7x + 3} - \sqrt{x^2 + 7x + 4} = x - 1.$$

(b) A man bought a certain number of rabbits for twenty rupees ; if he had obtained one more for the same sum, the cost price of each would have been rupee one less ; find the number of rabbits bought.

5. (a) Find the square root of

$$9 \left(x^3 + \frac{1}{x^4} \right) - 12x \left(x^4 + \frac{1}{x^2} \right) + 22x^2.$$

(b) Find the lowest common multiple of

$$4x^3 - x^2 - 4x + 1 \text{ and } 3x^3 - 3x^2 + x - 1.$$

PART B

6. Prove that the square described on the hypotenuse of a right-angled triangle is equal to the sum of the squares described on the other two sides.

Prove that if a perpendicular is drawn from the vertex of a triangle on the base, then the difference of the squares on the sides of the triangle is equal to the difference of the squares on the segments of the base.

7. Prove that the internal bisector of an angle of a triangle divides the opposite side internally in the ratio of the sides containing the angle, and likewise the external bisector externally.

Draw a triangle with sides 5 cm., 6 cm., and 7 cm., calculate the lengths of the segments of the longest side made by the bisector of the opposite angle.

8. (a) Prove that (i) the opposite angles of a quadrilateral inscribed in a circle are supplementary, and (ii) conversely, if the opposite angles of a quadrilateral are supplementary, it can be inscribed in a circle.

(b) A triangle is inscribed in a circle : prove that the sum of the angles in the exterior segments cut off by the sides is equal to four right angles.

9. (a) Construct a parallelogram equal in area to a given triangle, and having one of its angles equal to a given angle, and give a proof of the construction.

(b) In and about a circle of one inch radius, describe an equilateral triangle. Measure the side of each triangle.

10. Draw the direct and transverse common tangents of two circles whose radii are 2 cm. and 1.5 cm., and whose centres are 5 cm. apart. Measure the lengths of the tangents, and calculate their ratio.

TEST PAPERS

English Language

1. Write an essay of about 450 words on any one of the following :—

- (i) Your Favourite Leader.
- (ii) The Independence Day Celebrations.
- (iii) The Scene at a Municipal Election.
- (iv) The Education of Girls.

2. The following passage contains about 230 words. Make a precis of it in about 80 words, and suggest a suitable heading. At the bottom of your precis, state the number of words it contains:—

"One day when the Prince Siddhartha with a large retinue drove through the eastern gate of the city on the way to one of his parks, he met on the road an old man, broken and decrepit. One could see the veins and muscles over the whole of his body, his teeth chattered, he was covered with wrinkles, bald and hardly able to utter hollow and unmelodious sounds. He was bent on his stick and all his limbs and joints trembled.

"Who is that man?" said the Prince to his coachman, "he is small and weak, his flesh and his blood are dried up, his muscles stick to his skin, his head is white, his teeth chatter, his body is wasted away; leaning on his stick he is hardly able to walk, stumbling at every step. Is there something peculiar in his family, or is this the common lot of all created beings?"

"Sir," replied the coachman, "that man is sinking under old age, suffering has destroyed his strength, and he is despised by his relatives. He is without support and useless, and people have abandoned him like a dead tree in a forest. But this is not peculiar to his family. In every creature youth is defeated by old age. Your father, your friends, will come to the same state; this is the appointed end of all creatures."

3. Change the following into direct form :—

A trumpeter, having been overtaken on the battle-field, begged that he ought be spared. He pleaded that he had slain no man ; that he carried nothing worse than a trumpet, which was merely a signal for battle ; and that no one had ever been killed by a trumpet. The soldiers told him in reply that they would slay him, for he was a trumpeter. Although he did not kill any man himself, he incited others to do so. He was, therefore, quite as mischievous as men that fought.

4. Correct the following common errors in grammar and syntax :—

- (a) Mathematics are very difficult to learn.
- (b) They were suddenly aware of a startling phenomena.
- (c) The index to the book is very imperfect. The editor has paid little attention to indices and dates.
- (d) Three Maries and eight Henries have reigned in England.
- (e) There was a most unpleasant effluvia near the factory.
- (f) This book's price is a shilling.
- (g) He is one of the best men that has ever lived.
- (h) Lets you and I go for a walk.

5. Use the following pairs of words into sentences of your own to show that you clearly understand their meanings :—

- (a) Childish, Childlike ; (b) Affect, Effect ; (c) Beside, Besides ; (d) Bail, Bale ; (e) Die, Dye ; (f) Practice, Practise.

6. Give one word for the following :—

- (a) The life-story of a person written by himself.
- (b) One who looks at the dark sides of things.
- (c) One who is born after the death of his father.
- (d) Persons living at the same time.
- (e) That which cannot be blotted out.

- (f) One who lives on vegetable.
- (g) That which cannot be done without.
- (h) One who cannot read or write.

7. Use the following phrases in the sentences of your own to show that you clearly understand their meanings :—

(a) A maiden speech ; (b) Cry over spilt milk ; (c) Out of order ; (d) Cold blood ; (e) Call a spade a spade ; (f) Heart to heart talk ; (g) Play fast and loose ; (h) Take offence ; (i) Under lock and key ; and (j) Nip the evil in the bud.

8. Change the following sentences into negative form :—

(a) My knife is blunt ; (b) It is impossible to cross this river now ; (c) Sohan is richer than Hari ; (d) As soon as the train arrived, I rushed towards it ; and (e) Only a fool will do it.

General Knowledge & Current Affairs

1. Decipher the following abbreviations :—

(a) S.P.C.A., (b) B.I.S., (c) C.O.D., (d) O.K., (e) C.I.D., (f) C.I.F., (g) I.O.U., (h) F.O.R., (i) U.N.E.S.C.O., (j) I.S.T., (k) A.P.I.

2. Name the authors of the following books :—

(a) Seven Lamps of Architecture ; (b) Paradise Lost ; (c) Utopia ; (d) Das Capital ; (e) The Odyssey ; (f) Three Musketeers ; (g) The Politics ; (h) The Brothers ; (i) God & Evil ; and (j) Faust.

3. Name the following :—

(a) The famous English Novelist who wrote to pay off his debt.

(b) The Founder of Alexandria.

(c) The Father of the Indian Nation.

(d) The Russian Novelist whose philosophy influenced Mahatma Gandhi to a great extent.

(e) The French philosopher who gave us the idea of "Social Contract".

4. What public office is held by each of the following persons ?

(a) M. Trigvey Lie, (b) Shrimati Rajkumari Amrit Kaur, (c) General MacArthur, (d) Sardar K.M. Pannikar, (e) Maulana Abdul Kalam Azad, (f) Sir C.D. Deshmukh, (g) Sir S. Radhakrishnan, (h) Sir Bengal Narsing Rau, (i) Raja Sir Maharaj Singh, and (j) Pt. G.B. Pant.

5. What do you mean by :—

(a) *in perpetuum*, (b) *in futuro*, (c) *in forma pauperis*, (d) *in toto*, (e) *en route*, (f) *de novo*, (g) *coup de theatre*, (h) *exempli gratia*, (i) *eorrigenda*, and (j) *ad nauseam*.

6. (a) Name the member-states of the U.N. Security Council. (b) Name the patron saints of (i) England, (ii) Scotland, (iii) Ireland and (d) Wales.

7. What do you know of the following war terms :—

(a) Aircraft Carrier, (b) Amgot, (c) Bale out, (d) Black out, (e) Battalion, (f) Navicert, (g) Radar, (h) Protocol, (i) Profiteering, and (j) Open Town.

8. What do you mean by :—

(a) Home of cotton plant (b) Yellow River (c) White Man's Grave, (d) Gift of the Nile, (e) Queen of the Adriatic, (f) City of Seven Hills, (g) Playground of Europe, and (h) Land of the Midnight Sun.

9. In what sports do the following terms occur ?

(a) Slips, (b) Seconds, (c) Selling Plate, (d) Sliding Seat (e) Scissors.

10. In what countries are the following towns situated :—

(a) Montreal, (b) Newcastle, (c) Yokohama, (d) Peking, (e) Antwerp, (f) Riode Jeneiro, (g) Waterloo, (h) Venice, (i) Trivandrum, and (j) Hong-kong.

11. What powers took part in the following actions and with what result :—

(a) Battle of Trafalgar (1805), (b) Battle of Jutland, (c) Battle of the River Plate, (d) Battle of the Bismark Sea, (e) Battle of Truck.

12. State briefly what do you know about the following :—

(a) Annie Besant, (b) Maulana Abdul Kalam Azad, (c) Sir C.V. Raman, (d) Mrs. Vijaylakshmi Pandit, (e) Dr. B.R. Ambedkar, (f) Mr. Winston Churchill, (g) Vasco da Gama, (i) Sir S. Radhakrishnan.

13. Who invented the following :—

(a) Chloroform, (b) Bicycle, (c) Cinematograph, (d) X-rays, (e) Television, (f) Telephone, (g) Steam Engine, (h) Spectacles, (i) Telegraph, (j) Safety Locks.

14. Explain the following commercial terms :

(a) Bill of Lading, (b) Chamber of Commerce, (c) Balance of Trade, (d) At sight, (e) Assets, (f) Balance Sheet, (g) Brokera age, (i) Debenture.

15. What are the languages spoken by the majority in :

(a) Hyderabad Deccan, (b) Mysore, (c) Travancore, (d) Baroda, (e) Indore, (f) South Kanara, (g) Orissa, (h) Berar, (i) Bengal, and (j) Behar.

MATHEMATICS

Paper 1

1. (a) Express in words :—

3, 152, 782, 530, 325, 942.

(b) Find the greatest number of three digits and the least number of four digits which have 29 as their G.C.M.

2. Find the day of the week on 26th February, 1900.

3. A man's net income after paying income-tax of 4 p. a rupee is Rs. 2350 ; what would his net income be when the tax is raised to 5 p. a rupee.

4. (a) A garrison of 4500 men is provisioned for 15 weeks at the rate of 13 oz. for each man daily. How many men must leave that the same provisions may last for 27 weeks at 10 oz. for each man daily ?

(b) A, B, C and D enter into a partnership. A subscribes $\frac{1}{3}$ of the capital, B $\frac{1}{4}$, C $\frac{1}{5}$ and D the rest. How should they divide the profit of Rs. 6640. 10as.

5. A student has to secure 40 per cent. marks to pass. He gets 40 and fails by 40 marks. Find the maximum marks.

6. A person sells two houses for Rs. 308 each. On one he gains $12\frac{0}{10}$ and on the other he loses $12\frac{0}{10}$. Find his total gain or loss.

7. The discount on a certain sum due 4 years hence is Rs. 100 and the interest on the same sum and for the same time is Rs. 125. Find the sum and rate per cent.

8. A person holding £5000 in the 4 p.c. stock at 108 sells out and invests the proceeds in the 5 p.c. at 120. Find the amount of the new stock that he buys and the change in his income.

9. How long will it take to walk round the boundary of a square field having an area of 10 acres at 4 miles per hour?

10. Find the difference of simple and compound interest on Rs. 250 at 6 p.c. for $2\frac{1}{2}$ years.

MATHEMATICS

Paper 2

1. (a) Multiply $\frac{1}{9}x^2 + \frac{1}{16}y^2 + \frac{1}{12}x$ by $\frac{1}{3}x - \frac{1}{4}y$

(b) Simplify and then find the value if $a = 4$
 $-6a[5a - 3a - \{2a - (3a - 5a - 6a)\}]$

2. (a) Find the value of $x^3 + y^3 + z^3 - 3xyz$, when $x = 128$, $y = 126$ and $z = 136$

(b) The H.C.F. of two expressions is $5x^2 - 2x - 1$, their L.C.M. is $30x^4 + 13x^3 - 11x^2 - 7x - 1$. If one of the expressions is $10x^3 + x^2 - 4x - 1$, find the other.

3. Find the L.C.M. of $3x^3+2x^2-11x+4$
and $3x^3+14x^2+13x-8$.

4. (a) Eliminate t from $t^2+t+x=0$ and $t^2+gt+y=0$

(b) Find the continued product of $(1+x)(1+x^2)(1+x^4)$
without actual multiplication.

5. (a) Divide 156 into four parts, such that if the first part be diminished by 4, the second be increased by 5, the third be divided by 2 and the fourth be multiplied by 3, the result is the same.

(b) Solve $\frac{4y-6}{x+y}=2$ and $\frac{8x-5}{y-x}=9$.

PART B

1. (a) In a rt. angled triangle one of the acute angles is double of the other. Show that the hypotenuse is double of the shorter side.

(b) If the external bisector of an angle is parallel to the opposite side, prove that the triangle is isosceles.

2. OA, OB and OC are equal st. lines drawn from a point inside a circle to the circumference. Prove that O is the centre of the circle.

3. Prove that the straight line drawn through the middle point of one side of a triangle parallel to the second side bisects the third side.

4. (a) Draw a circle touching a given circle with centre O at a given point A and passing through a given point B.

(b) Bisect a given triangle by a st. line drawn parallel to the base.

5. (a) In an equilateral triangle BCD, $AB \perp CD$. Prove that $AB^2 = 3AC^2$.

(b) Prove that the sum of the squares on the four side of a parallelogram is equal to the sum of the squares on the diagonals.

6. If one of the diagonals of a trapezium divides the other in the ratio of 1 : 2, prove that one of the ll sides is twice the other.

SOLUTIONS OF TEST PAPERS

ENGLISH LANGUAGE

1. The Scene at a Municipal Election

Once there was an election for a City Father from amongst the residents of our ward. There had stood two contestants for the election. On one side there was L. Har Gopal and on the other was L. Roop Narain. Both were prominent figures in the ward and popular as well among the residents. The Municipal Committee announced May 30 as the date of election. All were eagerly waiting for the date. The nearer the election day came, the more proportion did the propaganda campaign of the respective candidates acquire.

At last the 30th May came. The whole ward was stirred up with enthusiasm and fervour activities. The polling booth was at a Municipal School premises. Two camps—one for each candidate—were pitched in the ground in front of the school. Chairs and benches were arranged both inside and outside the tents for the voters to come and sit before they cast their votes. Cars, motor lorries and tongas were busy in bringing the voters from their houses and all the roads leading to the Municipal School were thronged with the people. Soon the voters came out of the conveyances, they were received with great warmth and served sweets and cool drinks. The whole ground was awfully crowded. It presented a very busy scene. The supporters and sympathisers of both the candidates were crying hoarse requesting the voters to vote for their respective candidates. They were even dragging voters by force into their camps. When the enthusiasm ran high, there had been some unpleasant scenes between the supporters of the candidates. Police had to intervene to prevent the trouble from spreading and things were set right very soon.

The polling started at 9 a.m. The returning officer was a first class Magistrate who sat with his assistants and clerks with ballot papers before him. Both the candidates were seated at the table one on each side to identify the voters coming to vote in their favour. The voters went in one by one, took

their ballot paper, put a cross against the name of the candidate of their choice, and then put it in the ballot box kept for the purpose. In this way the polling continued right upto 5 o'clock with half an hour rest in between for refreshment etc.

The voting was over at 5 p.m. and the ballot box was taken to the Municipal Town Hall. The returning officer unlocked the ballot box and the work of counting the votes began in the presence of both the candidates. The counting was over at about 7 p.m. and it was found that L. Har Gopal had won by 400 votes. No sooner the result was declared, than the Town Hall resounded with the clapping of hands and deafening cheers and applause for L. Har Gopal. His friends, supporters and sympathisers doffed their caps and threw them into the air as a mark of their joy. Thereafter they formed a procession and passing through the main bazaars of the city reached the house of L. Har Gopal and later on trekked their way to their homes.

2. Heading : Old Age, The Destined End of All Creatures.

Precis

The sight of an old man, worn out with old age, having a thin lean body, wrinkled face, hairless head, bent back and too weak to talk well, made Prince Siddhartha ask his coachman who that was and whether all these infirmities and weaknesses were peculiar to him alone. The coachman replied that all these infirmities and indifference of one's relatives were due to old age which was the destined end of all creatures. It was not he alone who suffered all that.

3. A trumpeter, having been overtaken on the battlefield, said, "Pray let me be spared. I have slain no man ; I carry nothing worse than a trumpet, which is merely a signal for battle, and no one has ever been killed by a trumpet." The soldiers said, "We will slay you, for you are a trumpeter. Although you do not kill any man yourself, you incite others to do so. You are, therefore, quite as mischievous as men that fight."

4. (a) Mathematics is very difficult to learn.

(b) They were suddenly aware of a startling phenomenon.

(c) The index to the book is very imperfect. The editor has paid little attention to indexes and dates.

(d) Three Marys and eight Henrys have reigned in England.

(e) There was a most unpleasant effluvium near the factory.

(f) The price of this book is a shilling.

(g) He is one of the best men that have ever lived.

(h) Let you and me go for a walk.

5. (a) This childish behaviour is unworthy of your high position. His childlike simplicity has made him so popular.

(b) How does it affect you ? ; The president's speech had a great effect on the public mind.

(c) The baby is lying beside her mother ; Besides being a good politician he is a famous sportsman.

(d) He was released on bail ; The bale of cotton is very heavy.

(e) He died of cholera ; Please dye my turban rosy.

(f) Practice makes a man perfect ; He is practising swimming.

6. (a) autobiography ; (b) pessimist ; (c) posthumous ; (d) contemporaries ; (e) indelible ; (f) vegetarian ; (g) indispensable ; (h) illiterate.

7. (a) Though it was his maiden speech, everyone was impressed with it ; (b) It is no use crying over spilt milk ; (c) The typewriter has gone out of order ; (d) The poor fellow was murdered in cold blood ; (e) He is not popular, because he is in the habit of calling a spade a spade ; (f) I had a heart to heart talk with my friend ; (g) One should not play false and loose with the sincerity of one's friends ; (h) He took offence at my remarks and I had to apologise ; (i) You must keep your valuables under lock and key ; and (j) Nip the evil in the bud, or it will overcome you at last.

8. (a) My knife is not sharp ; (b) It is not possible to cross this river now ; (c) Hari is not as rich as Sohan ; (d) No sooner did the train arrive, I rushed towards it ; and (e) None but a fool will do it.

General Knowledge and Current Affairs.

1. (a) Society for the Prevention of Cruelty to Animals ; (b) Bank for International Settlement, (c) Cash on Delivery, (d) All Correct (Slang), (e) Criminal Investigation Department, (f) Cost Insurance & Freight, (g) I Owe You, (h) Free on Rail, (i) United Nations Economic, Social and Cultural Organisation, (j) Indian Standard Time, and (k) Associated Press of India..

2. (a) John Ruskin, (b) John Milton, (c) Sir Thomas More, (d) Karl Marx, (e) Homer, (f) Alexander Dumas, (g) Aristotle, (h) Dostoevsky, (i) C.E.M. Joad, and (j) Goethe.

3. (a) Sir Walter Scott, (b) Alexander the Great, (c) Mahatma Gandhi, (d) Tolstoy, (e) Rousseau.

4. (a) Secretary-General of the U. N. O., (b) Health Minister to the Government of India, (c) U.N. Commander in Korea, (d) Indian Ambassador to China, (e) Education Minister to the Government of India, (f) Finance Minister to the Government of India, (g) Indian Ambassador to Russia, (h) Indian representative at U.N.O., (i) Governor of Bombay, and (j) Premier of U.P.

5. (a) in perpetuity, (b) in the future, (c) as a poor man, (d) entirely, (e) on the way, (f) anew, (g) a sudden change in a situation, (h) for example, (i) things to be corrected, (j) to the point of disgust.

6. (a) The U.S.A., the U.K., the U.S.S.R., France, China, Ecuador, Cuba, Norway, Yugoslavia, Egypt and India.

(b) (i) St. George, (ii) St. Andrew, (iii) St. Patrick, (iv) St. David.

7. (a) A warship specially designed to aircraft, the deck of which can be used as a landing ground.

(b) Allied Military Government of an occupied territory

(c) To descend from a damaged aircraft by means of a parachute.

(d) Extinguishing all external lights and shading of all other lights so that no light is visible from the air, a measure of precaution against air-raids.

(e) A body of infantry usually organised in eight companies under a Lieutenant-Colonel.

(f) The method of certifying goods which might be imported into neutral countries.

(g) A secret weapon of war. It is an instrument to record the direction of distant bomber planes and invisible warships at night through radio-active waves.

(i) Rough draft of a diplomatic document.

(j) Making excessive profits by taking hold of a national crisis.

(k) A town which contains no military objectives.

8. (a) Berar, (b) The Hwang Ho river, (c) The Guinea coast of Africa, (d) Egypt, (e) Venice, (f) Rome, (g) Switzerland, (h) Hammerfest in Norway.

9. (a) Cricket, (b) Boxing, (c) Horse Racing, (d) Boat-racing, (e) Wrestling.

10. (a) Canada, (b) England, (c) Japan, (d) China, (e) Netherlands, (f) Brazil, (g) Belgium, (h) Italy, (i) India, and (j) China.

11. (a) France, Spain, and Britain, British were victorious.

(b) Britain and Germany. The German Fleet retired.

(c) Great Britain and Germany. The German Cruiser Graf Spee scuttled.

(d) Germany and the Allies. German convoy destroyed.

(e) U.S.A. vs. Japan. Japanese lost 19 ships and 210 aircraft.

12. (a) President of the Theosophical Society, founder of Home Rule League in India. President of the National Congress.

(b) President of the Congress 1940-46. A great Muslim theologian and philosopher ; now Education Minister of India.

(c) Famous Indian Scientist. Fellow of the Royal Society, Famous for the discoveries relating to light and sound.

(d) First Indian woman Minister ; sister of Pandit Nehru, was first Indian Ambassador to the U.S.S.R., now Indian Ambassador to U.S.A.

(e) A prominent leader of the depressed classes and was member of the Viceroy's Executive Committee, now Minister of Law to the Government of India.

(f) Born 1874, was Prime Minister of England during World War II, 1940-45. Now Leader of the Opposition Party in the British Parliament.

(g) Portuguese navigator, rounded Cape of Good Hope and discovered the sea route to India.

(h) Famous Indian philosopher, was Vice-Chancellor of Benares Hindu University and now Indian Ambassador to Russia.

13. (a) Sir James Harrison, (b) Karl Von Drais, (c) Thomas Edison (d) Rontgen, (e) John L Baird, (f) A. Graham Bell, (g) James Watt, (h) Alexander de Spina, (i) Morse, and (j) Joseph Bramah.

14. (a) A document acknowledging the shipment of goods, signed by or on behalf of the carrier, which contains the terms and conditions upon which the goods are agreed to be carried.

(b) An association of merchants and businessmen organised to promote the interests of trade of a country generally.

(c) An expression denoting the difference between the aggregate value of the imports and exports of a country.

(d) On bills of exchange this denotes that they are payable on demand without allowing days of grace.

(e) Property and possessions including debts owing to him, of every description belonging to a trader.

(f) A statement setting forth on one side the values of the assets of a firm and on the other side, its liabilities and capital.

(g) Allowance paid to a broker in consideration of his services rendered in the completion of a transaction between two parties.

(h) A document acknowledging the loans borrowed by a company issued under the common seal and embodying the terms and conditions as to repayment of money, rate of interest, etc.

15. (a) Marathi, Kanarese, Telugu, (b) Kanarese, (c) Malayalam and Tamil, (d) Gujarati and Marathi, (e) Hindi and Marathi, (f) Kanarese, (g) Oriya, (h) Marathi, (i) Bengali, and (j) Behari.

MATHEMATICS

PAPER I

1. (a) Three thousand one hundred and fifty two billions, seven hundred and eighty two thousand five hundred and thirty millions, three hundred and twentyfive thousand, nine hundred and forty two only.

(b) The greatest number of three digits is 999. Dividing 999 by 29, we get

$$\begin{array}{r}
 29 \overline{) 999} \text{ (34} \\
 \underline{87} \\
 129 \\
 \underline{116} \\
 13
 \end{array}$$

Hence the greatest number is $999 - 13 = 986$ Ans.

The least number of four digits is 1000

Dividing 1000 by 29 we get

$$\begin{array}{r}
 29 \overline{) 1000} \text{ (34} \\
 \underline{87} \\
 130 \\
 \underline{116} \\
 14
 \end{array}$$

Hence the least number is $1000 + (29 - 14) = 1015$. **Ans.**

2. 1600 years give	0	odd days.
200 do.	10	"
99 do.	1	"
24 Leap do.	3	"
January gives	3	"
February gives	5	"

Total 15

Divided by 7 we get only 1 odd day.

The day was Monday. **Ans.**

3. Suppose gross income is = Re. 1.

$$\text{Income-tax on Re. 1} = \frac{4}{192} = \frac{1}{48}$$

$$\text{Net income} = 1 - \frac{1}{48} = \frac{47}{48}$$

If net income is Re. $\frac{47}{48}$ gross income = Re. 1

$$,, \quad 1 \quad ,, \quad = \text{Rs. } \frac{48}{47}$$

$$,, \quad \text{Rs. 2350} \quad ,, \quad = \frac{48}{47} \times 2350$$

$$= \text{Rs. 2400} \quad \text{Ans.}$$

2nd Case

$$\text{Income-tax on Re. 1} = \frac{5}{192}$$

$$\text{Net income} = 1 - \frac{5}{192} = \frac{187}{192}$$

$$\text{Net income on Re. 1} = \frac{187}{192}$$

$$\begin{aligned} \text{Rs. 2400} &= \frac{187}{192} \times 2400 \\ &= \frac{82}{2} = \text{Rs. 2337. 8as. Ans.} \end{aligned}$$

4. (a)	Weeks	Rate	Men
	15	13 oz.	4500
	27	10 oz.	?

More weeks less men

Less rate more men

$$\therefore \begin{array}{l} 27 : 15 \\ 10 : 13 \end{array} \left. \vphantom{\begin{array}{l} 27 : 15 \\ 10 : 13 \end{array}} \right\} 4500 : x$$

$$4500 \quad 50 \quad 5$$

$$\therefore x = \frac{4500 \times 15 \times 13}{27 \times 10 \times 1} = 3250 \text{ men}$$

Hence $4500 - 3250 = 1250$ men must leave. **Ans.**

(b) A put in $\frac{1}{3}$ of the capital, B $\frac{1}{4}$ of the capital; C $\frac{1}{5}$ of the capital; D puts $1 - \frac{1}{3} - \frac{1}{4} - \frac{1}{5} = \frac{13}{60}$

$$\therefore \text{Ratio between the capitals : } \frac{1}{3} : \frac{1}{4} : \frac{1}{5} : \frac{13}{60}$$

or 20 : 15 : 12 : 13.

Hence Profits should be divided in the same ratio.

$$\text{Total} = 20 + 15 + 12 + 13 = 60$$

If total profit is 60, A gets = 20

$$\text{do.} \quad \text{do.} = \frac{20}{60}$$

If total profit is Rs. 6640-10 A gets $= \frac{20}{60} \times \text{Rs. } 6640-10$

$= \text{Rs. } 2213. 8\text{as. } 8\text{ps.}$

Similarly B gets $\frac{15}{60} \times \text{Rs. } 6640. 10\text{as.} = \text{Rs. } 1660. 2\text{as. } 6\text{ps.}$

Ans.

„ C $\frac{10}{60} \times \text{Rs. } 6640. 10\text{as.} = \text{Rs. } 1323. 2\text{as.}$

„ D $\frac{13}{60} \times \text{Rs. } 6640. 10\text{as.} = \text{Rs. } 1438. 12\text{as. } 10\text{ps.}$

5. The number of marks got $= 40$

The number of marks by which he fails $= 40$

\therefore The total marks for passing $= 80$

If pass marks are 40, maximum marks $= 100$

„ 1 „ $= \frac{100}{40}$

„ 80 „ $= \frac{100}{40} \times 80/2$
 $= 200$ **Ans.**

6. Suppose cost price $= 100$

Gain $= 12$

Selling price $= 100 + 12 = 112$

If selling price is 112, cost price $= 100$

„ 1 „ $= \frac{100}{112}$

„ 25 11
308 „ $= \frac{100}{112} \times 308$
 281
 $= 275$

Second case :

$$\begin{array}{rcl}
 \text{Suppose cost price} & = & 100 \\
 \text{Loss} & = & 12 \\
 \text{Selling price} & = & 88 \\
 \text{If selling price is 88, cost price} & = & 100 \\
 & = & \frac{100}{88} \\
 \text{1, } & & 14 \\
 & & 25 \\
 & = & \frac{100}{88} \times 308 \\
 308, & & 221 \\
 & = & 350
 \end{array}$$

$$\begin{array}{rcl}
 \text{Total cost price} & = & 275 + 350 = 625 \\
 \text{Total selling price} & = & 616 \\
 \text{Loss} & = & 625 - 616 = \text{Rs. 9 Ans.}
 \end{array}$$

$$7. \text{ Simple interest on a certain sum} = 125$$

$$\text{True discount on the same sum} = 100$$

$$\text{S.I.} - \text{T.D.} = \text{S.I. on T.D.}$$

$$\begin{array}{rcl}
 \therefore 125 - 100 & = & \text{S.I. on 100} \\
 25 & = & \text{S.I. on 100}
 \end{array}$$

$$\text{If S.I. is 25, the sum} = 100$$

$$\text{1} \quad \text{1} \quad \text{1} \quad = \frac{100}{25}$$

$$\text{125} \quad \text{125} \quad \text{5} \quad = \frac{100}{25} \times \frac{125}{5} = 500$$

$$\begin{array}{rcl}
 \therefore \text{Rate per cent} & = & \frac{125 \times 100}{4 \times 500} = 6\frac{1}{4}\% \text{ Ans.}
 \end{array}$$

$$\begin{aligned}
 8. \quad & \text{Income on 100 stock} & = 4 \\
 & \text{"} \quad 1 \quad \text{"} & = \frac{4}{100} \\
 & \text{"} \quad 5000 \quad \text{"} & = \frac{4}{100} \times \overset{50}{5000} = 200
 \end{aligned}$$

$$\begin{aligned}
 & \text{Money got by selling 100 stock} = 108 \\
 & \text{"} \quad \text{"} \quad 1 \quad \text{"} = \frac{108}{100} \\
 & \text{"} \quad \text{"} \quad 5000 \quad \text{"} = \frac{108}{100} \times \overset{50}{5000} = 5400
 \end{aligned}$$

$$\begin{aligned}
 & \text{For 120 cash stock bought} = 100 \\
 & 1 \quad \text{"} \quad \text{"} = \frac{100}{120}
 \end{aligned}$$

$$\begin{aligned}
 & 5400 \quad \text{"} \quad \text{"} = \frac{100}{120} \times \overset{45}{5400} = 4500 \quad \text{Ans.}
 \end{aligned}$$

$$\begin{aligned}
 & \text{Income on 100} & = 5 \\
 & \text{"} \quad 1 & = \frac{5}{100}
 \end{aligned}$$

$$\begin{aligned}
 & \text{"} \quad 4500 & = \frac{5}{100} \times \overset{45}{4500} = 225
 \end{aligned}$$

$$\text{Change in income} = 225 - 200 = \text{£}25 \quad \text{Ans.}$$

$$9. \quad \text{Area} = 10 \text{ acres} = 10 \times 4840 = 48400 \text{ sq. yds.}$$

$$\text{One side of the field} = \sqrt{48400} = 220 \text{ yds.}$$

$$\text{Perimeter} = 220 \times 4 = 880 \text{ yds.}$$

If distance is 4×1760 yds. time taken = 60 minutes

$$\frac{1}{4 \times 1760} = \frac{60}{15 \times 1}$$

$$\frac{880}{4 \times 1760} = \frac{60 \times 880}{15 \times 1}$$

$$= \frac{1}{2}$$

= $7\frac{1}{2}$ minutes. **Ans.**

10. Principal = 250
Rate = 6 p.c.
Time = $2\frac{1}{2}$ yrs.

$$\text{Simple interest} = \frac{250 \times 6 \times 5}{2 \times 100} = \frac{75}{2}$$

$$\text{C.A.} = 250 \times \frac{106}{100} \times \frac{106}{100} \times \frac{103}{100} = \frac{289327}{1000} = \text{Rs. } 37-8-0$$

$$\text{C.I.} = \frac{289327}{1000} - 250 = \frac{39327}{1000}$$

$$\text{Difference between C.I. and S.I.} = \frac{39327}{1000} = \text{Rs. } 38-5-3$$

$$= \text{Rs. } 1-13-3 \quad \text{Ans.}$$

MATHEMATICS

Paper 2.

$$\begin{aligned}
 1. \quad (a) \quad & \frac{1}{9} x^2 + \frac{1}{16} y^2 + \frac{1}{12} xy \\
 & \frac{\frac{1}{3} x}{\frac{1}{27} x^3 + \frac{1}{48} xy^2 + \frac{1}{36} x^2 y} - \frac{\frac{1}{4} y}{-\frac{1}{48} xy^2 - \frac{1}{36 x^2 y} - \frac{1}{64} y^3} \\
 & \frac{1}{27 x^3} - \frac{1}{64} y^3 \\
 & = \frac{1}{27} x^3 - \frac{1}{64} y^3 \quad \text{Ans.}
 \end{aligned}$$

$$\begin{aligned}
 (b) \quad & -6a[5a-3a-\{2a-(3a-5a-6a)\}] \\
 & = -6a[5a-3a-\{2a-(3a-5a+6a)\}] \\
 & = -6a+[5a-3a-\{2a-3a+5a-6a\}] \\
 & = -6a+[5a-3a-2a-3a+5a+6a] \\
 & = -6a+5a-3a-2a+3a-5a \\
 & = 14a-16a = -2a \\
 & = -2a \quad \text{Ans.}
 \end{aligned}$$

Second case

$$-2a = -2xa = -2x(-4) = 8 \quad \text{Ans.}$$

$$\begin{aligned}
 2. \quad (a) \quad & x^3 + y^3 + z^3 - 3xyz \\
 & = \frac{1}{2} \{ (x-y)^2 - (y-z)^2 + (z-x)^2 \} x(x+y+z) \\
 & = \frac{1}{2} \{ (128-126)^2 + (126-136)^2 + 136-128 \}^2 \\
 & \quad (128+126+136) \\
 & = \frac{1}{2} \{ (2)^2 + (-10)^2 + (8)^2 \} (390) \\
 & = \frac{1}{2} \{ 4 + 100 + 64 \} (390) \\
 & \quad 84 \\
 & = \frac{1}{2} \times 168 \times 390 = 32760 \quad \text{Ans.} \\
 & \quad 1
 \end{aligned}$$

(b) We know H.C.F. \times L.C.M. = Product of the two expressions.

\therefore When one expression is given, the other is obtained by the formula

$$\begin{aligned} & \frac{\text{H.C.F.} \times \text{L.C.M.}}{\text{1st Expression.}} \\ &= \frac{(5x^2 + 2x - 1)(30x^4 + 13x^3 - 11x^2 - 7x - 1)}{(10x^3 + x^2 - 4x - 1)} \\ &= \frac{(5x^2 + 2x - 1)(30x^4 + 13x^3 - 11x^2 - 7x - 1)}{(5x^2 - 2x - 1)(2x + 1)} \\ &= 15x^3 - x^2 - 5x - 1 \text{ Ans.} \end{aligned}$$

3. We know H.C.F. \times L.C.M. = 1st Exp. \times 2nd Exp.

$$\therefore \text{L.C.M.} = \frac{\text{1st Exp.} \times \text{2nd Exp.}}{\text{H. C. F.}}$$

We shall, therefore, first find the H. C. F. of the given expressions :—

$$\begin{array}{r} x^3 + 2x^2 - 11x + 4 \quad 1 \\ \underline{3x^3 + 14x^2 + 13x - 8} \\ 3x^3 + 2x^2 - 11x + 4 \\ \underline{12x^2 + 24x - 12} \\ 12 \mid 12x^2 + 24x - 12 \\ \quad \underline{x^2 + 2x - 1} \quad) \quad 3x^3 + 2x^2 - 11x + 4 \quad (3x \\ \quad \quad \underline{3x^3 + 6x^2 - 3x} \\ \quad \quad \quad \underline{-4x^2 - 8x + 4} \\ -4 \mid -4x^2 - 8x + 8 \quad \underline{1x^2 + 2x - 1} \\ \quad \quad \underline{x^2 + 2x + 1} \quad \underline{x^2 + 2x - 1} \\ \quad \quad \quad \times \end{array}$$

$$\therefore \text{H. C. F.} = x^2 + 2x - 1$$

Hence L. C. M.

$$= \frac{(3x^2 + 2x^2 - 11x + 4)(3x^3 + 14x^2 + 13x - 8)}{x^2 + 2x - 1}$$

$$= \frac{(3x-4)(x^2+2x-1)(3x^3+14x^2+13x-8)}{x^2+2x-1}$$

$$= 9x^4 + 30x^3 - 17x^2 + 76x + 32 \text{ Ans.}$$

$$4. (a) \begin{aligned} t^2 + ft + x &= 0 \dots\dots\dots(i) \\ t^2 + gt + y &= 0 \dots\dots\dots(ii) \end{aligned}$$

Solving these two equations (where t is the variable) as simultaneous equation, we have,

$$\frac{t^2}{fy - gx} = \frac{t}{x - y} - \frac{f}{g - f}$$

$$\therefore t^2 = \frac{fy - gx}{g - f} \dots\dots\dots(iii)$$

$$\text{and } t = \frac{x - y}{g - f}$$

$$\text{or } t^2 = \frac{(x - y)^2}{(g - f)^2} \dots\dots\dots(iv)$$

From (iii) and (iv)

$$\frac{fy - gx}{g - f} + \frac{(x - y)^2}{(g - f)^2}$$

or $(x + y)^2 = (fy - gx)(g - f)$ is the required eliminant.

4. (b) We shall make use of the formula

$(1 + a)(1 + b)(1 + c)$ to solve the question.

$$(1 + a)(1 + b)(1 + c) = 1 + (a + b + c) + (ab + ac + bc) + abc$$

$$\therefore (1 + x)(1 + x^2)(1 + x^4) = 1 + (x + x^2 + x^4) + (x^3 + x^5 + x^6)x \times x^2 \times x^4$$

$$- 1 + x + x^3 + x^4 + x^5 + x^6 + x^7 \quad \text{Ans.}$$

5. (a) Let a be the result which we obtain in each case.

$$\text{Then 1st part } -4 = a \quad \therefore \text{ 1st part} = a + 4$$

$$,, \quad \text{2nd part} + 5 = a \quad \therefore \text{ 2nd part} = a - 5$$

$$,, \quad \text{3rd part} \div 2 = a \quad \therefore \text{ 3rd part} = 2a$$

$$,, \quad \text{4th part} \times 3 = a \quad \therefore \text{ 4th part} = \frac{a}{3}$$

Hence $(a+4)+(a-5)+2a+\frac{a}{3}=156$

or $4\frac{1}{3}a=156$

i. e. $\frac{13}{3}a=156 \quad \therefore a=\frac{3 \times 156}{13} = 36$

\therefore 1st part is = 40, 2nd part is 31, 3rd part is 72, and 4th part is 12 **Ans.**

(b) (i) Equation

$$\frac{4y-6}{x+y}=2 \quad \text{or } 4y-6=2(x-y)$$

$$\begin{aligned} &= 4y-6=2x+2y \\ &= 4y-6-2x-2y=0 \\ &= -2x+2y-6=0 \end{aligned}$$

(ii) Equation

$$\frac{8x-5}{y-x}=9$$

$$\begin{aligned} &= (8x-5)=9(y-x) \\ &= 8x-5=9y-9x \\ &= 8x-5-9y+9x=0 \\ &= 17x-9y-5=0 \end{aligned}$$

So the equations are

	I	II	III	II
$-2x+2y-6=0 \dots\dots\dots(i)$	+2	-6	-2	+2
$+13x-9y-5=0 \dots\dots\dots(ii)$	-9	-5	+17	-9

By cross multiplication

$$\frac{x}{-10-54} = \frac{y}{-102-10} = \frac{1}{18-34}$$

$$= \frac{x}{-64} = \frac{y}{-112} = \frac{1}{-16}$$

$$\therefore x = \frac{1}{-16} \times -64 = 4$$

$$\text{and } y = \frac{1}{-16} x^{-112} = 7$$

$$x=4, \quad y=7 \text{ Ans.}$$

Part B

1. (a) Given : A rt. angled triangle ABC in which
 $\angle A = 30^\circ$ & $\angle C = 60^\circ$

To prove that : $BC = \frac{1}{2} AC$.

Const : From the rt. angle $\angle B$, cut off
 $\angle ABO = 30^\circ$

Proof : $\angle ABO = 30^\circ \quad \therefore \angle OBC = 60^\circ$

$\therefore \triangle BOC$ is equilateral.

$\therefore BC = CO = BO \dots\dots\dots (i)$

In $\triangle AOB$; $\angle BAO = \angle ABO = 30^\circ$

$\therefore AO = BO$

Hence $BC = AO \dots\dots\dots (ii)$

But $BC = CO$

$\therefore BC = \frac{1}{2} (AO + CO) = \frac{1}{2} AC \quad \text{(Q.E.D.)}$

- (b) Given : AD is the external bisector of an angle of a
 $\triangle ABC$, such that $AD \parallel BC$

To prove that : the $\triangle ABC$ is isosceles.

Proof : $AD \parallel BC \dots\dots\dots (\text{given})$

Hence $\angle DAC = \angle C \dots\dots\dots (\text{Alt. } \angle s)$

And $\angle DAE = \angle B \dots\dots\dots (\text{Corres. } \angle s)$

But $\angle DAC = \angle DAE \dots\dots\dots (\text{given})$

$\therefore \angle B = \angle C$

Hence $\triangle ABC$ is an isosceles.

2. Given : From a pt. O, within a circle equal st. line
 OA, OB, and OC are drawn.

To prove : O is the centre of the circle.

Cons : Join AB and BC.

Proof : $OA=OB$ $\therefore O$ lies on the right bisector of AB .

Similarly $OB=OC$ $\therefore O$ lies on the right bisector of BC

Hence O is the only point common to the right bisectors of AB and BC

$\therefore O$ is the centre of the \odot , (Q.E.D.)

3. Given : $\triangle ABC$. From P the middle point of AB ,
 PQ is $\parallel BC$

To prove : $AQ=CQ$

Const. : Through A draw $XAY \parallel BC$

Proof : $XY \parallel PQ \parallel BC$ and AB cuts them
 such that $AP=PB$(given)

\therefore Intercepts AQ and QC on the transversal AC
 made by the \parallel st. lines XY, PQ and BC must
 also be equal.

$\therefore AQ=CQ$ (Q.E.D.)

4. (a) Let a \odot with centre O be the given \odot , and a pt.
 A on it. B is another given pt.

Steps of construction :

1. Join AB and draw CL the right bisector of AB .
2. Join OA and produce it to meet CL in C .
3. Then with centre C and radius equal to CA or CB draw the circle.

This is the required. (Q.E.F.)

(b) Let ABC be the given \triangle .

Steps of Construction :

1. On AB as diameter draw a semi circle.
2. Let M be the mid. point of AB .
3. Draw $ML \perp AB$ meeting the semi circle in L .
4. With centre A and radius equal to AL draw an arc cutting AB in P .

5. Through P draw $PQ \parallel BC$.

Then PQ is the required st. line. (Q.E.F.)

5. (a) Given : An equilateral triangle BCD, $AB \perp CD$.

To prove : $AB^2 = 3AC^2$

Proof : In right angled $\triangle ABC$

$$\angle A = 1 \text{ rt. } \angle$$

$$\begin{aligned} \therefore AB^2 &= BC^2 - AC^2 \\ &= CD^2 - AC^2 \quad (\because BC = CD) \\ &= (2AC^2) - AC^2 \end{aligned}$$

$$\text{Hence } AB^2 = 4AC^2 - AC^2 = 3AC^2 \quad (\text{Q.E.D.})$$

- (b) Given : A parallelogram ABCD, with the diagonals AC and BD intersecting each other at O.

To prove : $AB^2 + BC^2 + CD^2 + AD^2 = AC^2 + BD^2$

Proof : The diagonals of the parallelogram bisect each other.

$$\text{In } \triangle ABD : AB^2 + AD^2 = 2AO^2 + 2OB^2 \dots\dots\dots (i)$$

$$\text{In } \triangle BCD : BC^2 + CD^2 = 2OC^2 + 2OB^2 \dots\dots\dots (ii)$$

$$\begin{aligned} \text{Add (i) and (ii) : } AB^2 + BC^2 + CD^2 + AD^2 &= 4AO^2 \\ &\quad + 4OB^2 \\ &\quad (\because AO = OC) \end{aligned}$$

$$\text{But } 4 \left(\frac{AC}{2} \right)^2 + 4 \left(\frac{BD}{2} \right)^2 = AC^2 + BD^2$$

$$\text{Hence } AB^2 + BC^2 + CD^2 + AD^2 = AC^2 + BD^2 \quad (\text{Q.E.D.})$$

6. Given : A trapezium ABCD and its diagonals AC and BD intersecting at O, such that $OD : OB :: 1 : 2$.

To prove that : $AB = 2 CD$

Proof : In \triangle s AOB and COD

$$\angle ABO = \angle CDO \quad (\text{alt. } \angle \text{s.})$$

$$\angle AOB = \angle COD \quad (\text{vert. opp. } \angle \text{s.})$$

\therefore The third angle must be equal.

Hence the \triangle s. AOB and COD are equivangular and similar.

$$\therefore \frac{AB}{CD} :: \frac{OB}{OD} = \frac{2}{1}$$

$$\therefore AB = 2CD$$

(Q.E.D.)

SOLUTIONS

GENERAL KNOWLEDGE

January, 1949

1. (a) United Nations Educational, Scientific and Cultural Organisation ; (b) United Nations Organisation ; (c) Air Raid Precautions ; (d) European Recovery Programme ; (e) Tennessee Valley Authority.

2. (a) Khawaja Nazimuddin (b) Pt. Jawaharlall Nehru ; (c) Mr. C. R. Attlee ; (d) Sir Maharaj Singh ; (e) Pt. G. V. Pant ; (f) Mr. Harry S. Truman ; (g) Sir C. D. Deshmukh ; (h) Sir S. Radhakrishnan ; (i) General K. M. Cariappa ; (j) Queen Juliana.

3. (a) In Dìgboi fields in Assam ; (b) Kodarama in Hazaribagh District and Nellore in Madras ; (c) In the gold fields of Kolar in Mysore ; (d) On the beach sands of Travancore and Cape Comoria ; (e) In Singhbhum District of Bihar.

4. (a) A suburb of New York in America. Headquarters of the U.N.O. ; (b) Island and seaport of the Straits Settlement. Naval station of greatest strategic importance. Here a dock-yard was recently constructed ; (c) In Egypt, a point where German advance was halted in the World War II and then these German armies were made to retreat ; (d) Town in C. P. where Mahatma Gandhi had his headquarters and had established his Sevagram Ashram. Famous for the Wardha Scheme of Education ; (e) Seaport of Japan. First city to be destroyed by the atom bomb in 1945.

5. (a) An aeroplane in which a simpler device to burn the fuel to cause expansion of gases and let these expanded gases rush out through a jet towards the rear of the aircraft thus urging it forward by reaction, is used.

(b) A recently discovered drug which has completely revolutionised medical treatment. It is non-poisonous to human body, yet very efficacious against growth of puss and other diseases bacterias.

(c) A minute particle charged with negative electricity or a unit negative charge having inertia, normally forming part of an atom but capable of isolation as in cathoderays.

(d) A sensitive electrical instrument by which the exact position of distant objects on land, in the air, and on or underneath the surface of water, is located by radio waves.

(e) This word is an abbreviation for Anti-Submarine Detector Indicator Committee which invented an instrument for detecting the enemy submarines, wrecks, shoals of fish, etc., under water by the use of echoes. It was used during the World War II.

6. Babar (1526-30); Humayun (1539-40); and (1555-56); Akbar (1556-1605); Jahangir (1605-28); Shah Jahan (1628-58); Aurangzeb (1658-1707); Bahadur Shah (1707-12); Jahangir Shah (1712-13); Farukh Sayyid (1713-19); Mohammed Shah (1719-48); Ahmed Shah (1748-54); A'angir II (1751-56).

7. (a) In West Bengal, where the construction of an important irrigation and power generating project is already in hand. When completed, the project will provide perennial irrigation to three quarter of a million acres and generate 300,000 kw of power. (b) In Chhota Nagpur. Famous for the Tata Iron and Steel Works. (d) In Orissa on the Mahanadi river at nine miles above Sambalpur. Here the Hirakud Dam Project is under construction which will irrigate over one million acres of land, generate 350,000 kw of energy and provide navigation facilities. (e) A sea port on the east coast of India where ship building yards have been built by the Scindia Steam Navigation Co. and has a Naval training centre.

8. *Scientists* : Lord Rutherford, Madame Curie, Faraday.
Painters : Raphael, Rubens, Jamini Roy.
Poets : Tagore, Tennyson, Dante.
Generals : Hannibal, Eisenhower, Montgomery.
Admirals : Drake, Nelson, Rodney.

9. (a) 5-52 P.M.; (b) 5-10 P.M.; (c) 6-56 A.M.; (d) 4-28 P.M.; (e) 1-15 P.M.

10. Tiger, Lion, Porcupine and Rhinoceros are the animals found in a wild state in India.

11. (a) It spreads due to a minute animal parasite (*plasmodium*) which is carried to the body by the bite of an infected mosquito (*Anopheles*). The fever occasions paroxysms which tend to re-appear every other day or every third day, according to the nature of the infecting parasite.

(b) By infected food and water which get contaminated by *vibrio bacilli* at the source, during storage, transit or cooking.

(c) The disease first spreads among the rats which begin to die and the fleas after leaving the dead bodies of the rats attack the inmates of the house spreading the disease amongst them. It is a serious and usually fatal disease caused by a germ called *bacillus pestis*.

(d) It spreads due to the absorption in the alimentary canal of a germ called *Bacillus typhosus* often found in excreta of persons who once suffered from the disease. Infection is conveyed by a contaminated water supply, milk, food, or defective sanitary arrangements.

12. Petrol after it has been charged with air in the carburetter, enters the cylinder where an electric spark passing in the sparking plugs explodes it. The heat thus produced in the explosion causes a sudden expansion of the gases which thereby forcibly push down the piston connected to a crankshaft attached to the driving shaft which drives the rear wheels. After the explosion the pistons are brought back to their original position by the action of the fly wheel and the process is repeated.

13. The following are the questions which came before the U.N.O. in 1948 and in which India was deeply interested :—

(a) Kashmir Issue ; (b) Hyderabad Issue ; (c) Indonesian Issue ; and (d) South African Issue.

14. The King effigy has ceased to be a feature of postage stamps after August 1947. The new series depict subjects of archaeological and historical interest. The following are the

stamps of different denominations ranging from three pies to 15 rup es bearing the emblems mentioned against each :—

3 pies	... Ajanta Panel, from the famous Ajanta caves.
6 „	... Konarak Horse, from the sun temple at Konarak.
9 „	... Trimurti, from an image at Elephanta.
1 anna	... Bodhisattva, an image of Bodhisattva now in the provincial museum in Lucknow.
2 „	... Nataraja or some other representation from South Indian antiquities.
3 „	... Sanchi stupa, one of the gateways of the great stupa, at Sanchi.
3½ „	... Bodh Gaya temple, from Behar.
4 „	... Bhuvaneswara Temple, from Orissa.
6 „	... Gol Gumbud, Bijnor.
8 „	... Kandarya Mahadeva Temple (Khajuraho).
12 „	... Golden Temple at Amritsar.
1 Rupee	... Victory Tower Chittorgarh.
2 „	... Delhi's Red Fort.
5 „	... Taj Mahal at Agra.
10 „	... Delhi's Qutab Minar.
15 „	... Satrunjaya Temple of Patiala.

15. The following countries of the world lie on the equator :—

Indonesia, some islands in the mid Pacific Ocean, Ecuador, Southern tip of Colombia, Brazil, French Equatorial Africa, Belgian, Congo, Uganda and Kenya.

16. Goddard, Rae, Walcott, Stollmeyer, Weckes, Jones, Ferguson, Cameron, Gomez, and Christian.

17. (a) The Thames, (b) The Tiber, (c) The Spree, (d) The Seine, (e) Confluence of the Ganga and the Jamuna, (f) The Mahanadi, (g) On the seashore, (h) The Mississippi, (i) The Nile, (j) The Kistna.

18. (a) A warship specially designed to aircraft, the deck of which can be used as a landing ground ; (b) A smaller vessel designed to sweep mines, it is fitted with a paravane which cut the mooring of mines without cutting them ; (c) A bullet

which leaves a smoke trail to mark its course ; (d) Armies on the march for an offensive are provided with Air Force flying over them for protection against enemy surprise attack ; (e) It is a ship which can both float on the surface of sea as well as underneath it. It is provided with ballast tanks, full of air while floating on the surface when submerging it, the air is replaced by water. It has a round or square conning or lookout tower and a periscope or reflecting instrument which are its eyes under water.

19. (i) Reclamation of waste land throughout the country ; (ii) Use of Modern agricultural equipments such as tractors, etc. (iii) Increased use of fertilisers in the soil to increase its productivity ; (iv) Several big irrigation schemes are underway for irrigation of lands where rains are not enough. (v) Increase in acreage under cultivation.

20. (a) Pulp of wood and grass ; (b) Mixture of copper and zinc ; (c) By burning a variety stone ; (d) An explosive mixture of charcoal, sulphur and nitre ; (e) A compound of Hydrogen and Oxygen.

21. (a) United Kingdom—Mr. C. R. Attlee ; (b) Canada—Mr. Louis St. Laurent ; (c) Australia—Joseph Chieffy ; (d) New Zealand—Mr. Peter Frazer ; (e) South Africa—Dr. Malan ; (f) India—Pt. Jawaharlall Nehru ; (g) Ceylon—Dr. Senanayake ; (h) Pakistan—Mr. Liaqut Ali Khan.

22. Madras, Bezwada, Kazipet, Wardha, Nagpur, Bhopal, Jhansi, Gwalior, Mathura and Delhi.

23. (a) Victorious side—British and Prussian ; Defeated side—French. The battle was fought in Belgium.

(b) Xarxes defeated Athens at Thermopylae in Greece.

(c) Ahmad Shah Durrani defeated the Mahrattas at Panipat near Delhi.

(d) The Normans defeated the English King Harold in Sussex, England.

(e) Earl of Marlborough defeated the French in Bavaria on the Danube.

SOLUTION

GENERAL KNOWLEDGE

August 1949

1. (a) General K. M. Cariappa ; (b) Dr. Daniel Malan ; (c) Mr. E. Bevin ; (d) Dr. K. N. Katju ; (e) Mr. Sita Ram ; (f) Justice H. J. Kania ; (g) John Goddard ; (h) Shri Purshottam Das Tandon ; (i) Maj-General Chaudhuri ; (j) Kishen.

2. (a) *Lenin* : Russia—An active worker of the Russian Revolution 1893—1917 ; (b) *Baden Powell* : Britain—Founder of the Well Boy Scouts Association in 1908. Chief Scout of the world ; (c) *Henry Ford* : U. S. A.—Inventor of the well-known Ford Motor cars and farm tractors ; (d) *Captain Scott* : Britain—a great explorer ; (e) *Sir J. C. Bose* : India—Eminent Indian Scientist. Gained a world-wide reputation of his researches into Plant Physiology ; (f) *Pasteur* : France—A great bacteriologist ; (g) *George Bernard Shaw* : Ireland—A great Play-wright ; (h) *Ranji* : India—A great Batsman in whose memory a golden Trophy for Inter Provincial Championship was presented by the Maharaja of Patiala ; (i) *Thakin Nu* : Burma—an eminent statesman ; (j) *Rodin* : France—a great sculptor.

3. (a) Town and urban district of Britain. Famous for Public School ; (b) In West Pakistan. Famous for excavations. Old seat of Buddhist culture ; (c) Switzerland—Capital and International town ; (d) Seaport of Japan. First city which was destroyed by Atom Bomb ; (e) Natal South Africa—a great commercial town ; (f) India—Delhi—Samadhi of Mahatma Gandhi ; (g) Italy—leaning tower ; (h) England—Famous for its observatory from which standard time is reckoned. First Meridian begins from here ; (i) Greece—An important border town ; (j) Palestine—Capital, port and manufacturing city.

4. (a) Greeks and Persians—Greeks ; (b) English and French—English ; (c) The Pandavas and Kauravas—Pandavas ; (d) Babar and Ibrahim Lcdy—Babar ; (e) English and Germans—Germans.

5. (a) Dr. Rabindranath Tagore ; (b) Sir Charles Darwin ; (c) Adolf Hitler ; (d) A. Dumas ; (e) Kalidas ; (f) Sir Walter Scott ; (g) Pt. Jawaharlall Nehru ; (h) William Shakespeare ; (i) Robert Lewis Stevenson ; (j) Conand Doyle.

6. (a) Name of 40 varieties of tropical evergreen trees from the bark of which Quinine is extracted. Its bark as well as quinine, are used as antidotes to Malaria. Though native of hot, wet slopes of Andes, it has been successfully planted in the Himalayas, Nilgiri Hills, Sumatra and Java.

(b) Grown in sub-tropical regions between 3000 to 6000 ft. height above sea level. Its nut is used as dried fruit and its bark is used for cleansing teeth. Its wood is very valuable for carving.

(c) Grown in temperate climate—a familiar tree of the olive family remarkable for its thick foliage and height from 100 to 150 ft. Its timber is very valuable and is used for wheel making.

(d) A white substance with a strong punjeant smell mainly obtained from wood and leaves of a tree of the cinnamon family which grows in Japan, Formosa, Central China and the Malaya Peninsula. It is chiefly used in medicines.

(e) A tropical plant grown in Monsoon regions especially in the Terai areas ; grows from 50 to 60 feet high. The stem is used for making charpies, huts, etc. etc.

7. (a) Ankara ; (b) Washington ; (c) Tokyo ; (d) Cairo ; (e) Dublin.

8. (a) 55 B.C. ; (b) 1776 ; (c) 15th August, 1947 ; (d) 1792 ; (e) O.A.D.

9. (a) Rear-Admiral Robert Edwin Paery ; (b) Sir Francis Drake ; (c) Vasco da Gama ; (d) Captain Cook ; (e) Galileo.

10. (a) Breath and dried clothes and dried poxes of patient. Isolate the patient. Disinfect the room and the clothes of the patient before washing. Get anti-smallpox vaccination.

(b) The bite of mad dog or jackal. Use Potassium Permanganate in the wound. Consult the doctor. Take the victim to Kasauli Sanatorium.

(c) The breath and excreta of the patient, the house fly. Prevent contamination of edibles, use B.C.G. vaccine.

11. Vitamins are components of certain natural food substances which are essential for health and growth. So far 7 vitamins, namely, A, B, C, D, E, F, G have been discovered. Vitamin A is generally found in food having a yellow or green colour, namely, cod liver oil, eggs, livers of animals and green vegetables. Vitamin B is contained in green vegetables, tomatoes, eggs, milk, yeast, nuts, beans, cereals, etc. etc. Vitamin C is found in green vegetables, especially cabbages, turnips, tomatoes and also in oranges and lemons.

12. (a) This animal is found in Africa. It is the tallest animal in the world. It has very long legs and neck and a short body. Its hump is made of fat and is a store house of food. It can also store water in its stomach.

(b) Found in dense jungles of India, Burma and Africa. It is the largest existing quadruped with a large trunk to eat, drink and breathe. It has large ivory tusks of considerable commercial importance. It is used as a beast of burden.

(c) It is a rodent animal with short scaly ears and webbed hind feet. Found in cold countries, such as, North America, Russia, Poland. It is famous for its skill in building.

13. Fire burns in the presence of oxygen which it gets from the air. By putting sand, the flames are smothered for want of air.

14. Thermos flask is double walled-glass bottle containing air in between the walls. Air is a bad conductor. Hot liquid in it, therefore, cannot radiate away their heat quickly.

15. The telephone consists of a thin disc of iron vibrating in front of a magnet surrounded by a coil of insulated copper wire which is connected with a similar coil at a distant place. Currents of electricity are induced when speaking into the mouth piece of the instrument. These currents are transmitted through the line and thus sounds are reproduced.

16. Mechanical energy is converted into electrical energy by a dynamo, an electric machine consisting of electro magnets, between the poles of which is an armature of coils of insulated

copper wire, which is made to revolve by mechanical power, thus producing the electric current.

It is carried into our homes by means of copper wires, over head or under ground. Electricity is used in thousand and one purposes, to name a few, lighting, cooking, heating, running of fans, air-conditioning, refrigerating, freezing, medical operations, running of trams, buses, rails and driving of machines for industrial purposes, etc. etc.

17. The conference met to decide the way in which India could remain a member of the British Commonwealth of Nations, after she becomes a republic.

The countries which participated in this conference were, Britain, Canada, Australia, New Zealand, South Africa, India, Pakistan and Ceylon.

They decided to remain united "as free and equal, members in the Commonwealth of Nations" freely co-operating in the pursuit of peace, liberty and progress.

At this conference India agreed to remain a full and equal member of the Commonwealth of Nations freely co-operating in the pursuit of peace, liberty and progress.

The Govt. of India agreed to accept the King merely as symbolic head of this "free association of Independent members." The King will have no constitutional functions as far as India is concerned. The future head of the Republican India will be an elected President, who will express the sovereign will of the people and exercise the functions hitherto performed by the King.

Thus the British Crown ceased to be the ruling symbol in New Delhi and became, for India, merely the symbol of her association with the Commonwealth of Nations. India ceased to owe allegiance to the Crown when her Republic Constitution came into force on the 26th January, 1950, while all the other Dominions, including Pakistan and Ceylon, continue to owe such allegiance.

18. India had charged Pakistan in the Security Council of not only allowing the raiders to pass through its territory but also for the presence of regular Pakistani troops among the

raiders who attacked the valley of Kashmir in October 1948. Pakistan denied all these charges and called these raiders as volunteers of Azad Kashmir fighting for their liberty. The Security Council therefore appointed a commission to investigate into the charges of India at the spot and report their findings to the Council as soon as possible. This Commission was called the United Nations Commission for India and Pakistan.

The Commission came to the Indian continent and studied the situation at the spot and could not escape from the conclusion that India's charges were true. Simultaneously Pakistan also confessed the presence of their regular troops, but under the pretext that their troops were there for preventing any attack by India via Kashmir.

The Commission worked on the policy of appeasement of both the parties and every attempt to bring both India and Pakistan to any final settlement proved abortive. However, it succeeded in the cease-fire on 1st January, 1949, and demarcation of cease-fire line. As the Commission could not do anything more, it was dissolved and a mediator appointed.

19. Olympic games are held every four year in member countries in turn. These were instituted in ancient Greece in honour of Zeus at Olympus. These continued for one thousand years but were stopped in 394. After a long lapse of 1500 years they were revived in 1896 by Lord Baron Parre de Cumberton. The Olympiad was not held in 1916, 1940 and 1944 due to war. The 14th Olympiad was held in 1948 at Wembley, London.

India has been the holder of Hockey Olympiad ever since its entry in 1924. In other games she has not yet stood the ground.

20. (a) United States of Soviet Russia, (b) His/Her Excellency; (c) All India Radio; (d) Valuable Payable Parcel; (e) Rastriya Sawayam Sewak; (f) Field Marshal; (g) Before Christ; (h) His Master's Voice; (i) Save Our Souls; (j) Indian National Army.

21. The policy of merging the Indian States into Unions was started by Late Sardar Vallabhbhai Patel, the Deputy Prime Minister of India.

One of the States Unions so formed is Madhya Bharat or Malwa Union. Some of the premier States in the group are Gwalior, Indore, Dhar, Devas and Khilchipur.

SOLUTION

GENERAL KNOWLEDGE

February 1950

1. (a) India's Ambassador to the U. S. A.; (b) Health Minister to the Government of India; (c) Governor of West Bengal; (d) Indian High Commissioner in Pakistan; (e) Was Military Governor of Hyderabad; (f) Chancellor of Exchequer in the British Cabinet; (g) Foreign Secretary in the British Labour Govt.; (h) U.S. Secretary of State for Foreign Affairs; (i) Foreign Minister to the Government of Pakistan; (j) Chief Minister of Jammu and Kashmir States.

2. (a) a contractor of the word *videlicet*, which means namely; (b) abbreviation of Latin word *id est* which means that is; (c) etcetra; (d) Nota Bena—note well; (e) Non-commissioned Cadet; (f) World Health Organisation; (g) His or Her Excellency; (h) His or Her Highness; (i) United Nations Commission for India and Pakistan; (j) British Broadcasting Corporation.

3. (a) The dot-dash heterogeneous code devised by Morse telegraphy; (b) The system of lettering or embossed dots used for enabling the blind to read by touch. It was invented by the French Inventor Braille who was himself blinded at the age of 3; (c) Enactments prescribed by law which impose penalty—physical or financial—for certain acts of commission and/or omission; (d) Rules made for drivers for the safe and smooth travel facilities.

4. (a) It consists of a glass tube with a uniform bore and bulb at one end containing mercury or alcohol which expands or contracts by variations in the temperature and the state of the atmosphere, body, liquid or gas with regard to heat is indicated by a scale on the surface of the tube. It is used in ascertaining the temperatures. Various forms of thermometer are used for particular purposes. The chief scales

of thermometers are (i) Fahrenheit ; (ii) Centigrade ; (iii) Reaumur.

(b) It is a glass tube 3 ft. long filled with mercury and closed at the upper end, the lower end being plunged into a vessel filled with mercury. This causes the liquid in the tube to descend a few inches leaving a vacuum at the top. The surface of the mercury rises when the air gets heavier and falls when the air gets lighter. It is used for measuring the weight of pressure of the atmosphere of a place at any time.

(c) It consists of a metal funnel 8 inches across leading down into a vessel placed to catch the rain that falls upon and through the funnel. It is used for measuring the amount of rainfall per square inch at any place.

(d) Instrument for intensifying sound. It establishes an electric current between two sensitised conducting bodies and is aided by telephone. It is used in telephone communication, in radio receiving sets, broadcasting and gramophone recording.

5. (a) Banyan tree, the Peepal tree and the Neem tree.
(b) Trinari, Peach trees and plums ; (c) Deodar, teak and spruce ;
(d) Banana, Mango and Orange.

6. (a) 483 B. C. ; (b) 10th May, 1857 A. D. ; (c) July 2, 1914 ; (d) September 3, 1939 ; (e) January 26, 1950.

7. (a) Pigs, monkeys and deer ; (b) Parrots, sparrows and crows ; (c) Bats, Mice and Squirrels ; (d) Ants, rusts and weevils.

8. (a) This order is given to soldiers at parade when they are required to be alert. This requires them to stand erect with heels together, hands stretched down, eyes in front and chest forward.

(b) This order is given to give practice to soldiers in marching in steps. The left and right foot is brought up with knees at right angles and brought down in turn keeping the hand swinging as in actual marching but on the same place.

(c) This order is given to enable the soldiers to be briefly relaxed. The left foot apart is brought one foot to the left

and the hands are put behind together. If the soldiers are armed with guns at the time of this order, the butt of arm piece is brought close to the right foot and the right hand in it pushed forward.

(d) This order is given during March past. This is done by twisting the neck a little towards the right while marching past.

9. The following are the probable causes of the food shortage in India :—

(a) With the partition of India, the wheat-growing areas have gone into Pakistan and India has to feed its after-partition population which has increased considerably with the immigration of Hindus from Pakistan, without any corresponding increase in the food production.

(b) Nature has all along been unkind to India during the last 10 years. Somewhere floods, somewhere draughts and somewhere earthquakes have destroyed a large part of standing crops.

(c) India has not yet been able to increase its acreage of production for want of modern agricultural implements, manures, irrigation facilities and want of education to make better use of soil.

(d) Cash crops such as cotton, jute, etc., are being grown on much of the cultivable land since the World War II instead of growing food on it.

10. (a) The pedals transfer power to the toothed wheel and sets it in motion.

(b) The chain transfers motion from the toothed wheel to the free wheel.

(c) The Free wheel sets the hind wheel into motion.

(d) The handle helps in keeping the balance and steering the bicycle.

11. (a) In the Hyderabad State, is famous for caves, containing ancient Indian sculpture and fresco painting.

(b) A seven-storeyed tower built by Kutab-id-din Aibek. It is situated near Mehrauli, a town about 11 miles off Delhi.

The first two storeys were damaged by storm and were consequently pulled down.

(c) The confluence of there sacred rivers of North India namely, the Ganges, the Jumna and the Saraswati—at Allaha bad in U.P., is called Tribeni. The ashes of Mahatma Gandhi were immersed here.

(d) Near Benares in U.P. known for Buddhist temples and remains.

(e) A suburb of New York in America. Headquarters os the U.N.O. are situated here.

(f) A borough of London in England. Famous for its observatory from which standard time is reckoned. First meridian begins from here.

(g) New Headquarters of the Metropolitan Police in London. A museum is also built here.

(h) A street in London in which the Chief Government Offices are situated. It runs from Charing Cross to Parliament Street.

(i) A big citadel in Moscow containing the cathedral where the Czars were crowned. It is now the Headquarters of the Government of the U.S.S.R.

(j) In Italy, the official residence of the Pope and the Headquarters of the Roman Catholicism. It is the largest Palace in the world in size.

12. (a) A term used in the game of cricket. The first over of a bowler is called maiden.

(b) The first speech ever delivered by a person.

(c) The race in which there is exact equality.

(d) A game in which neither party wins.

13. (a) Mahatma Gandhi ; (b) James Boswell ; (c) Shakespeare ; (d) Lewis Carrol ; (e) Minoo Masani ; (f) Robert Lewis Stevenson ; (g) Firdausi ; (h) Rudyard Kipling ; (i) Milton.

14.	<i>Army</i>	<i>Navy</i>	<i>Air Force</i>
	Second-Lieutenant.	Petty Officer.	Pilot Officer.
	Captain.	Commodore.	Flying Officer.
	Major.	Rear Admiral.	Squadron Leader.
	Colonel.	Admiral.	Group Captain.
	Brigadier.		
	Major General.		
	General.		

15. (a) Dr. Rajendra Prasad was the President of the constitution-making body; (b) Dr. Ambedkar was the Chairman of the Drafting Committee; (c) Shri K. M. Munshi was the member of the Drafting Committee; (d) Prof. K. T. Shah took an active part in the deliberation of each and every article of the Constitution.

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